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## More De-centralisation

EVERY recent major railway re-organisation has involved further delegation of responsibility from general managements to lower levels: in Britain, in India, in Canada—as on the Canadian National Railways, of which the new organisation is discussed on page 296, and elsewhere. Once the earlier phase of functional management of British Railways was deemed to have achieved its object of consolidating the newly-nationalised system by achieving uniformity of practice where this was thought necessary, a start was made on de-centralisation. A fillip was given by the Conservative Government which came into power in 1951. Under the Transport Act of 1953 greater autonomy was accorded the Regions. Since then each of the six Regions has evolved, and has put or is still putting into effect, its own form of re-organisation of the traffic departments, embracing commercial and operating activities, and motive power. The London Midland Region scheme, implementation of which began in 1957, provided for a Director of Traffic Services at Regional headquarters in London, to whom report six Divisional Traffic Managers in London, Birmingham, Nottingham, Manchester, Liverpool and Barrow-in-Furness. Each of the latter is responsible for the commercial, operating, and motive power activities in the several districts in his Division.

Earlier this week the Region announced a second stage of de-centralisation of traffic activities. Details are given elsewhere in this issue. In brief, the functions of the Director of Traffic Services are divided between three Line Traffic Managers whose headquarters will be at Crewe, Derby, and Manchester. The Divisional Traffic Managers will report to them, and not, as at present, to Regional headquarters in London. The Line Traffic Managers themselves will be solely responsible to the General Manager, Mr. David Blee. The post of Director of Traffic Services is to be abolished. Because Line Traffic Managers are answerable direct to the General Manager, their appointment is not intended to form a fourth level of traffic management, which, it could be said, was interposed between Regional headquarters and Divisional headquarters in the chain of Regional, Divisional, and District responsibility. Nevertheless there must be staff, though few in number, at Regional headquarters to advise the General Manager on traffic matters.

## Advantages of L. M. Region Organisation

THE new London Midland Region traffic organisation has obvious advantages as regards operating, notably in the division of the areas of the Line Traffic Managers at Crewe and Derby along "lines of cleavage"—the main lines of the former London & North Western and Midland Railways. The London Division is divided into two areas, covering the southern ends of the former L.N.W.R. and M.R., and responsible respectively to Line Traffic Managers at Crewe and Derby. For operating purposes the area for which the Line Traffic Manager, Manchester, is responsible is not so happily placed; but this and other factors have been taken into account in determining the form of the new organisation. An important point is that many large concerns will do business with the seven Divisional Traffic Managers. Those who have been dealing with the headquarters of the Director of Traffic Services at Euston will have no difficulty in contacting Line Traffic Managers if they find it undesirable to visit Crewe, for instance, from London, for the officers concerned will be active in visiting commercial and industrial centres. A major consideration is control of rate quotation to eliminate the dangers of under-cutting rates quoted by other district officers for similar consignments, and of failing, through zeal in securing business, to obtain an adequate margin of profit.

## Commercial Prices for Railway Assets

THE British Transport Commission is asking, very properly, what it considers a reasonable price, £200,000, for lengths totalling 22 miles of the abandoned line of the former Midland & Great Northern Joint Railway in Norfolk. The lengths are between Aylsham and Caister, on the Kings Lynn to Yarmouth section, from which services were withdrawn in 1959. In determining the price asked, the Commission has taken into account the cost of the civil engineering work in building the railway. The prospective purchaser, the Norfolk County Council, which intends to build a road along the formation, thinks the price not only too high, but unreasonable. The Chairman of its Highways Committee, Alderman Frank Easton, is reported to have stated that as most of the funds for a new road would be derived from a Ministry of Transport grant, sale would be "a paper transfer." That is not the case. The British Transport Commission is under the statutory obligation to achieve financial equilibrium in its undertaking, which includes British Railways. It must, therefore, charge what it feels it can get when it sells an asset. To demand an artificially low price from a body which receives financial help from the Treasury would not be conducive to the financial discipline to be expected in nationalised undertakings and in local authorities.

## Wagon Trends in Russia

POSSIBLY a feature readily apparent to a traveller on the railways of the U.S.S.R. is the small number of special wagons and the small number of special types. Of course, the nature of traffic is quite different from what it is on Western European railways; but apart from hoppers, flat wagons, and tank wagons, more or less standard open and covered wagons seem to handle almost all the traffic. There are a number of

special well wagons for transformer and boiler transport; otherwise the main "special" seems to be refrigerator cars for long-distance fruit and vegetable traffic, and here attempts are now being made to run block trains of up to 26 wagons, one of which is a power car containing plant for the continuous cooling of the other 25, the coolant circulating through a single-pipe system. Although steel is used for new open wagons, a combination of wood and steel still seems to have been applied to newly-built covered wagons. Probably some 60 per cent of goods wagons are two-axle; but bogie wagons and increasing capacity, for example up to 80 tons for bogie hoppers, are the principal feature of present-day trends, and many of these vehicles have automatic centre couplers.

### Overseas Railway Traffic

**C**ANADIAN Pacific Railway revenue for July amounted to \$37,424,257 compared with \$40,867,948 in July, 1959. Railway expenses were \$35,168,403 (\$38,128,732) resulting in net earnings of \$2,255,854 (\$2,739,216). Aggregate net earnings from January 1 to July 31 amounted to \$17,620,961 compared with \$19,745,696 in the corresponding period of 1959. Operating revenues of the Canadian National Railways for the month of July amounted to \$56,447,000. Expenses, taxes, and rents totalled \$58,996,000 resulting in a net operating income deficiency for the month of \$2,549,000. In July, 1959, operating revenues were \$63,076,000; expenses, taxes, and rents were \$62,661,000, and the net operating income was \$415,000. East African Railways & Harbours approximate railway revenue for July amounted to £1,640,000, a decrease of £45,000 compared with July of last year. There was a decrease in earnings from goods traffic and from inland marine and road services, which at £1,285,000, £52,000 and £43,000 were respectively £45,000, £7,000 and £2,000 lower than in July of the previous year. There were increases of £3,000 in receipts from passenger and other coaching traffic and £4,000 from miscellaneous earnings.

### Surveying the Diesel Engine Industry

**S**TRONG but healthy competition has for many years been a characteristic of the diesel engine manufacturing industry. Measures taken to reduce the cost per horsepower by improved productivity and increased output ratings have often led to a better product reaching the market and other beneficial results to individual users. This may apply particularly to the power ranges used for railway traction. In view of this it is interesting that the relatively new form of trade survey, interfirm comparison, is very shortly to be applied in the British diesel industry. Introduced to this country by the British Institute of Management, and operated by the Centre for Interfirm Comparison Limited in conjunction with the British Productivity Council, the scheme depends on the extended use of management-accountancy parameters which are widely accepted already. The importance of I.F.C. lies in its ability to aid the management of one firm to assess progress in terms of productivity and specific efficiencies compared with others of all sizes in the same industry. Figures are sent in strict confidence direct to the centre which processes the data and makes available the results for a basic fee of about £50 a year.

### Door-to-Door Transport

**O**NE of many ingenious features on the Roadrailer prototype semi-trailer freight vehicles designed and built by the Pressed Steel Co. Ltd., in co-operation with British Railways, and described elsewhere in this issue, is the simplicity of the means whereby the power of the vacuum-operated Girling disc brakes for rail-mounted use can be adjusted to any one of three stages according to the load condition of the vehicle. Braking on the alternative set of wheels used when the vehicles are hauled individually by road-motor tractor, is by air-operated drum brakes. Another use for compressed air is at the transfer points when it is necessary to move the rocking beams carrying the tandem wheel sets. For this action an air motor rotates the complete rubber torsion-spring assembly through an arc of about 70 deg. Principal requirements for the establishment of transfer depots are a section of track with the ground built up to rail level, a supply of compressed

air, the provision of four-wheel adapter vehicles for use at the front of each articulated set of Roadrailers, and sufficient road-motor tractors of standard design. The use of high-tensile corrosion-resistant steel and aluminium alloy has enabled a 2:1 tare/load ratio to be achieved despite the extra running gear carried.

### South African Dynamometer Car

**N**EW and up-to-date dynamometer cars are still rare birds, and must continue so, for comparatively few railways can give them sufficient useful work to make them economical propositions. The few cars set to work in the last three or four years have been intended more specifically for the testing of diesel and electric locomotives; but the latest vehicle, that of the South African Railways, which arrived at Durban in May, may still expect a good deal of work in connection with steam locomotives, though suitable also for measuring the performances of the newer types of power. Running on 3-ft. 6-in. gauge tracks, capable of taking up drawbar pulls in the neighbourhood of 80,000 lb. and withstanding buffing loads of 550,000 lb., this car is said to have cost £110,000, of which £60,000 is due to the special measuring and recording equipment, and the items in a small workshop. Included in the car is equipment for measuring braking forces and determining whether the locomotive and train braking is sufficient for any particular set of conditions.

### Asiatic Railway Conference

**T**HE second of the Asia Railway Conference meetings is to be held in Tokyo for some 10 days from October 10. The Japanese National Railways will be host and organising body, as in the first conference held in 1958. The meeting is open to any railway in Asia, but the majority of the delegates will probably come from the South-East and Mid-East countries of the continent. Apart from various papers open for discussion, there are to be discussions on other subjects of direct common interest; but a prominent feature is to be visits of inspection to various centres on the J.N.R. and Japanese private railways, and also to the works of Japanese manufacturers, for co-operating with the J.N.R. in the exhibition of railway equipment and other matters are the Japanese Rolling Stock Exporters' Association and the Japanese Machinery Exporters' Association. The relevant Government Ministries also are supporting the J.N.R. in their efforts. The conference seems to be now well established and is to be held regularly in future, though whether yearly or at two-yearly intervals has not yet been decided.

### Successful Inverness-Aberdeen Diesel Service

**T**HE success of the 2½-hr. diesel service introduced by the Scottish Region, British Railways, between Inverness and Aberdeen on July 1, shows what can be achieved with fast diesel services in an area frequented by summer holiday-makers. The distance is 108 miles, and there are four stops: at Nairn, Forres, Elgin, and Keith Junction. A "mini-buffer" in each train serves light refreshments. The service was intended originally to run only to September 10, at the end of the tourist season, but it is to continue until the end of the year to test the demand for these facilities outside the summer months. A traffic survey in August showed that tourists or local people on holiday formed a large proportion of the passengers. It is hoped that the existence of the fast service in winter—when motoring in north-eastern Scotland can be unpleasant and dangerous—will attract businessmen and local residents who otherwise might travel by other means. The 2½-hr. schedule will remain the same. The populations of Inverness and Aberdeen are respectively some 28,000 and 190,000, and the intermediate area is not highly populated, but the venture seems to have good chances of success.

### Long Coaches and Curves

**T**HOUGH in Britain no increase in coach length has been made for quarter of a century or more, longer passenger coaches have been a feature of the last decade in very many countries, notably in Germany and France, where 26-metre (86 ft.) vehicles are to be found in profusion. Moreover these



coaches run extensively over other systems—in Austria, Switzerland, Belgium and Italy, for example. There is no difficulty in building all-steel coaches of this length and with 19 m. (62 ft. 6 in.) bogie pitch of 33 tons tare; and aluminium-alloy coaches of these dimensions are now running on tares of 25 to 29 tons. The limiting factor today is the throw-over of the centre portion on curves—the end projections usually can be kept within the loading gauge by tapering inwards—and good riding on the sharpest curves. The throw-over on curves of 250 m. (820 ft.) or less from time to time limits the routes of which such long coaches can run, particularly where tunnels prevent any local widening of the six-foot. To obviate making long coaches of reduced width for these sections, and as a corollary to make even longer coaches for non-restrictive lines and to improve riding on curves, a method is now being tried in Germany whereby the bogie bolster side movement is varied automatically as a function of the curvature, being made dependent on the rotation of the bogie below the coach body.

### An Over-run Signal

THE side-long collision between the "Pines Express" and a diesel train from Buxton, at Slade Lane Junction near Manchester on November 26, 1959, is another case of a driver over-running a signal at danger. There were two colour-light signals, each with a junction indicator, side by side. The down fast signal was "off" with a left-hand indicator showing for the "Pines Express" to cross from fast to slow. The down slow signal was "on," as the diesel train on that line was being held to give the express precedence. At the inquiry, held by Colonel D. McMullen, it was proved conclusively that the down slow signal was "on." Yet the driver was emphatic that as he came up to it, it changed from red to yellow with a right-hand indicator. Colonel McMullen could find no explanation for the driver's mistake, and so this case, like others, has been made known to the Medical Research Council in connection with the special investigation now being made into human failures of this nature. It is to be hoped that that body will reach some conclusion as to these apparently inexplicable lapses, and suggest some means of preventing them.

### Höllental Line Conversion

IT is commonly understood that the considerable French interest in industrial-frequency single-phase electric traction dates from the occupation of the French Zone in Germany after the war, for this zone included the celebrated Höllental line in the Black Forest, running eastward from Freiburg to Donaueschingen. It will be recollected that a 35-mile section of this line was electrified on 50-cycle single-phase current, this section from Freiburg to Neustadt including 1-in-17 gradients, originally worked by steam rack-and-adhesion locomotives. Several types of electric locomotives were tried on this route in order to get information for future possible extensions; but by the beginning of the war no proposals had been made for the conversion of other lines. On the contrary, the Reichsbahn in those years was extending its 16-6-cycle 15-kV. single-phase network. The French used this line and its equipment for many of the preliminary investigations prior to the electrification of the Annécly line; but now the wheel has come full circle, and the Höllental line has recently been converted to the German standard 16-6-cycle system, and is now operated simply as a branch of the Mannheim-Basle electrified main line.

### Electric Suburban Trains

AN essential part of the recent 25-kV single-phase electrification of the Paris-Lille line was always considered to be the operation of the suburban traffic out of the Gare du Nord, hitherto worked by push-and-pull steam trains of up to 400 tons in weight and handled by large 2-8-2T and 4-8-4T steam engines. On electrification being sanctioned, a decision was made to adopt a triple-car multiple-unit train as the basic suburban formation; but it was realised that building one or two prototypes and testing them thoroughly would lead to delay in turning the suburban traffic over from steam. Therefore a certain number of the well-known BB 16500-class electric locomotives building for the various S.N.C.F. schemes

in north-eastern and eastern France were arranged to run in push-and-pull services with formations of existing suburban coaches, and each train wired throughout. This enabled many of the suburban services to be operated electrically as soon as the overhead lines were up and the power supply connected, and also permitted a cut of 12 min. in the times out to Survilliers and Creil. As occasions would arise when these converted trains would have to be handled by steam, the 110-V d.c. lighting, steam-heating and steam-reversing controls were retained, and the additions comprised the through electric control system, electric heating, automatically operated doors and a new second lighting system.

### Better Results for C.I.E.

THE first full year of working of Coras Iompair Eireann since the coming into force of the Transport Act, 1958, ended with a reduction of £1,239,858 in the deficit. The tenth report of the board for the year ended March 31, 1960, a copy of which has been sent us by the Chairman Dr. C. S. Andrews, shows a net deficit of £709,006, compared with one of £1,949,864 for the preceding 12 months. Under the Act the portion of the undertaking of the Great Northern Railway Board situated in the Republic of Ireland was merged with C.I.E., which now operates all railways in the Republic. The County Donegal Joint Committee railway undertaking was closed on January 1, 1960.

The principal results for 1958-59 and 1959-60 are given below. For purposes of comparison the 1958-59 figures have been adjusted to include operating results, estimated as necessary, for the six months to September 30, 1958, for the G.N.R.(I.) lines taken over by C.I.E. on October 1, 1958.

	1958-59	1959-60
	£	£
<b>Railways</b>		
Passenger receipts ... ..	3,404,894	3,513,452
Goods receipts... ..	4,143,687	4,267,007
Miscellaneous receipts ... ..	71,470	70,301
Total receipts ... ..	7,620,051	7,850,760
Expenditure ... ..	8,867,540	8,409,374
Loss ... ..	1,247,489	558,614
<b>Road Passengers—</b>		
Receipts ... ..	6,459,338	6,779,706
Expenditure ... ..	5,675,923	5,911,226
Net receipts ... ..	783,415	868,480
<b>Road Haulage—</b>		
Receipts ... ..	1,894,044	2,094,269
Expenditure ... ..	1,791,979	1,927,154
Net receipts ... ..	102,065	167,115
<b>Canals, loss</b> ... ..	79,071	74,330
<b>Docks &amp; Harbours, loss</b> ... ..	13,076	9,598
<b>Hotels, Refreshment Rooms &amp; Restaurant Cars, net receipts</b> ... ..	44,581	65,567
<b>Total loss</b> ... ..	1,949,864	709,006

The report is published in a new and attractive format, with photographs of motive power and rolling stock and other equipment recently introduced, such as a Taylor Jumbo mobile crane used for unloading motorcars at Kingsbridge Station, Dublin; installations such as the main-line signalbox at Kingsbridge; and C.I.E. hotels. The pictorial symbols used in some of the statistical tables will not prove helpful to many readers.

Net receipts of £446,978 were achieved on operation in 1959-60, compared with an operating loss of £424,415 for the previous year. This improvement was the result of a combination of an increase in revenue and a reduction in operation costs. Each department showed a better operating result. A new Commercial Department was established to enable the board to avail itself of the freedom conferred on it by the Act of 1958 in rates and charges and of common carrier obligations. The policy of the "package deal" was introduced for merchandise and livestock. About 400 such deals were concluded. The report states that an extensive publicity campaign in the form of newspaper advertising, brochures, and talks was undertaken, and that these measures resulted in a considerable increase in revenue.

As to railways, the loss of £1,247,489 for the year ended March 31, 1959, was reduced to £558,614. Revenue was increased by £230,709 and expenditure was reduced by £458,166. Compared with the previous year, revenue from passenger trains was higher by £108,558 and railway goods services earned an additional £123,320.

Net receipts from the road passenger services were £868,480,

against £783,415 for the previous 12 months. The record number of 300 million passengers was carried. Revenue from motor coach and educational tours, factory outings, and excursions contributed to an increase in receipts. The road freight services achieved net receipts of £167,115, against £102,065 for 1958-59. This was the result from increased carryings of beet, general merchandise and more extensive work with the county councils. The hotels and catering services, earned a profit of £65,567 against £44,581 for the previous year. A two-year project of extension and development for the seven hotels is in hand. During the year, the C.I.E. canal services were discontinued except for through traffic between Dublin and Limerick.

In May, 1959, £3 million Transport Stock redeemable not later than 1975 and bearing interest at 5 per cent was created and issued at £96 per £100 of stock. The stock is guaranteed by the State as to principal and interest. The annual cost to the C.I.E. board of meeting interest and sinking fund charges on this issue is £195,000. The Transport Act of 1958 relieved the board of liability to pay interest on the 3 per cent Transport Stock 1955-60. This eliminated a charge in the year under review of £296,672. Against this, an additional charge was introduced into the accounts, amounting to £146,250, representing interest and sinking fund contribution on the new Transport Stock referred to above.

Employment of management consultants was extended, during the year and a survey was undertaken of the board's management structure and operations. A new department was created for research and development and the board was awarded a grant of £35,000 from the Counterpart Fund for research work. Work study teams of C.I.E. employees were formed and trained, and extensive work study was undertaken, particularly at Inchicore works and in the Traffic Department.

During the year it was decided that certain lines could not be made to pay their way, and as there seemed to be no prospect of their becoming economic within a reasonable period, road services were substituted. The lines were Cavan-Leitrim; Dundalk-Clones; Monaghan-Cavan; Inny Junction-Cavan; Headford Junction-Kenmare; Claremorris-Ballinrobe; and Farranfore-Valentia. The economies accruing from this decision are not fully reflected in the accounts under review. Several stations were renovated and redecorated. The practice of staffing certain of the main-line trains with hostesses was initiated.

Joint consultation was established with the trade unions and the staff at all levels. Six labour liaison officers were appointed to different districts. A suggestions committee was set up and is in permanent being, to deal with suggestions from the staff and from the general public. Cash prizes were awarded to the staff for meritorious suggestions. The apprentice and continuation education schemes were continued throughout the year. To meet the higher costs resulting from salary and wage increases it was necessary to increase rates and fares. The number of staff was reduced to 20,921 compared with 22,109 in 1958-59.

### Canadian National Re-organisation

A PLAN for the re-organisation and structure of the Canadian National Railways with the aim of decentralising authority and modernising administrative techniques, has been announced by Mr. Donald Gordon, Chairman & President. To increase effectiveness in serving the transport market, it is planned to replace the present departmental type of management structure by integrating the sales and operations functions at all levels of the administration.

The present C.N.R. organisation in Canada, with its familiar three regions, 10 districts, and 31 divisions, covering 25,000 route miles exclusive of the 700 miles of 3-ft. 6-in. gauge railway on the Newfoundland Division, is to be re-constituted into five regions, which in turn are to be divided into 18 business units with jurisdiction over all railway transport activities in the designated geographic areas. The new organisation should thus eliminate one level of supervision, and should also localise the administration through the setting up of area administrations in which authority for both sales and operations will be combined. The present Canadian National Central Regions—which include nearly all of Ontario and Quebec—are to be divided into two; the St. Lawrence Region with headquarters in Montreal, the Great Lakes Region with headquarters at

Toronto. Similarly, the present Western Region, which includes the entire territory west from the head of the Great Lakes to the Pacific Ocean, is to be divided into two regions: the Prairie Region with headquarters at Winnipeg, and the Mountain Region with headquarters at Edmonton. The present Atlantic Region, with headquarters at Moncton, New Brunswick, is to remain substantially the same.

This re-organisation follows two years of intensive study of railway operations and administration. It may be said to reflect the far-reaching changes which have taken place in both the transportation market and the technology of transportation since the basic organisational structure of the C.N.R. was established many years ago. On the marketing side, the growth in transportation services offered by pipe-lines, highway transport, commercial airlines and ships underlines the need for new sales techniques, and greater flexibility in meeting the demands of competition. At the same time great physical changes have been made, including full conversion to diesel operation, with the resulting effects such as greater train lengths and weights, faster schedules, better utilisation of locomotives, centralised traffic control being introduced progressively across the system, improved equipment design and maintenance, automatically controlled marshalling yards, and electronic data processing.

### Air-Conditioning Trends

ANY cast into the future in regard to main-line passenger traffic on world railways as a whole must involve consideration of air-conditioning as a vital factor, not merely as a necessary adjunct to tropical journeys but as something which in half-a-dozen years or so will be regarded as a normal amenity in temperate climates, European or otherwise. It is quite likely that this will be the next major step in passenger carriage design. Already length, total weight, weight per seat, strength, and so forth, have been investigated in great detail and the results incorporated in normal designs. The Hooton investigation into seat shape and dimensions has not been given its due, but probably designers will never be able to depart from their own preferences, often based on no logical thought or observation. Nor can it be hoped that general advance in bogie design will be widely applied, despite the studies made under the aegis of the International Union of Railways (U.I.C.) and the reasonable riding provided by several existing designs. These matters, even that of seats, are not those on which public opinion can impinge directly with any force; but the provision of air-conditioning in a few years is likely to be influenced very directly by public insistence.

Fortunately, air-conditioning of passenger stock today presents no particular technical problem. Weight has already been reduced, reliability and accessibility of constituents improved, and regulation of car-interior conditions made wider and easier. There remain simply the normal installation questions of fitting the equipment in the best possible way into the particular carriage. The principles of air-conditioning, too, seem to have settled down, and the great majority of air-conditioned equipments in the six continents are of Stone-Carrier, Safety or Luwa-Jettair types, all of which are to be found in passenger coaches and in diesel multi-car trains. The spread of air-conditioning in temperate climates and for non-luxury trains has been given impetus by the decision to fit another 20 D.S.G. (Deutsche Schlafwagen- und Speisewagen Gesellschaft) restaurant cars with the Jettair system by 1962, following the successful operation of 10 cars during the present year. All 30 are existing vehicles modified, and according to the German Federal Railway the cost of rebuilding is about DM.40,000 (£3,400) and the time in shops for the conversion about two months. To bring some amelioration of hot-weather conditions in another 90 restaurant cars of the D.S.G. an interim modification is being applied before next summer whereby these cars will be given a special forced-air circulation on what is stated to be a "layer" pattern. The Jettair air-conditioning system has been installed recently in 22 new sleeping cars of the D.S.G., and is to go into another 20 yet to be built. The method of installing new air-conditioning equipment into coaches in the shops for normal overhaul has been practised also in India, where many Stone-Carrier sets have been put into different classes of passenger stock as opportunity has offered during the last year or two, and it seems not unlikely that a good deal of the air-conditioning business in future will be in this form.



## Eastern Region Winter Passenger Services

**D**ECELERATIONS are a principal feature of the Eastern Region winter timetables. On the Great Northern main line recovery times in express schedules, already considerable, are being increased by 9 min. in the down direction and 10 min. in the up, to a minimum of 25 min. down and 27 min. up between Kings Cross and the point where the North Eastern Region takes over. This further increase is understood to compensate for delays caused by reconstruction of Peterborough Station; but as every express train either stops there or passes at 20 m.p.h. it is hard to see how even the worst speed restrictions over the affected length can require so much additional time.

In the down direction the 1 a.m. "Tynesider," 7.50 a.m. "White Rose," and 8.10 a.m. "Talisman" will all leave Kings Cross 5 min. earlier. The arrival times of the 11 a.m. to Glasgow, the 6.12 p.m. to Leeds, and the 10.15 p.m. to Aberdeen will be unchanged, but most other arrivals at destination of down expresses will be 8—11 min. later; the 4 p.m. "Talisman" will be 6 min. later only into Edinburgh, at 10.51 p.m. The 4.10 p.m. from Kings Cross to Grimsby and Cleethorpes will start at 4.5 p.m. and call additionally at Huntingdon.

In the up direction the arrivals at Kings Cross will be almost all 11—13 min. later; the 10 a.m. from Leeds will be decelerated by 19 min., the 3.35 (now to be 3.32) p.m. "White Rose" by 16 min., and the 4.38 p.m. "Queen of Scots" by 15 min. The up "Tees-Thames" is to call additionally at Welwyn Garden City, and to arrive 13 min. later, at 12.28 p.m. It is surprising that this station rather than Hitchin should have been selected for what may prove a useful setting-down point in that a stop at Hitchin would have given good connections from Tees-side to the industrial centres of Letchworth and Stevenage, besides those nearer London. One result of all these decelerations is to make a clean sweep of all Great Northern Line mile-a-minute runs, with a couple of minor exceptions.

Between Sheffield and Manchester the electric service is being put on an even-interval basis. From Sheffield the trains will leave at 45 min. past each hr. from 8.45 a.m. to 7.45 p.m., and at 9.45 and 10.45 p.m., all to Manchester Piccadilly, except the 11.45 a.m. and 6.45 p.m. through Hull-Liverpool trains, which run to Manchester Central. In the opposite direction departures will be at 10 min. past the hr. from Piccadilly (except 10.10 a.m.) and at 7.36 and 8.30 a.m., 7.10 and 9.10 p.m.; there are also two Liverpool-Hull trains from Manchester Central. There will be no acceleration of the already fast times, for the most part 53 min. westbound and 54 min. eastbound between Sheffield and Manchester Piccadilly.

This systematisation will be to some extent at the expense of connections from points east and south of Sheffield. The 6.45 a.m. from Leicester will miss the 8.45 a.m. from Sheffield by 5 min., the 7.30 a.m. from Leicester the 9.45 a.m. by 7 min., the 8.16 a.m. from Cleethorpes the 10.45 a.m. by 4 min., and the 11.54 a.m. the 2.45 p.m. by 3 min.; until now the two former have been through trains to Manchester, and through passengers by all four services will have to wait nearly 1 hr. In the opposite direction the Sheffield connections are rather better.

On the Great Eastern Line, to facilitate the conversion from 1,500 V. d.c. to 25 kV., a.c. electrification, the electric service will be completely suspended for about four months between Shenfield and Chelmsford. In the mornings and evenings a shuttle service will be provided by diesel multiple-units, connecting at Shenfield with the Liverpool Street to Shenfield and Southend electric trains, but no local trains will run between the 9.10 a.m. and 4.20 p.m. from Shenfield and the 10.24 a.m. and 4.8 p.m. from Chelmsford; during this period Ingatestone will have no service, though Chelmsford will retain its main-line trains. Of the latter, however, the 12.33 and 3.33 p.m. from Liverpool Street to Clacton and the 9 a.m. and 12 noon from Clacton to London will be withdrawn; the Clacton-Colchester electric service will provide connections at Colchester with Liverpool Street-Yarmouth trains at approximately the same times.

From Mondays to Fridays the Liverpool Street-Norwich trains from 10.30 a.m. to 2.30 p.m., and the up trains from 9.45 a.m. to 1.45 p.m. inclusive from Norwich, have extra time allowed to compensate for electrification delay between

Shenfield and Colchester, from 10 to 16 min. each, and the same applies to the 12.39 p.m. down and 8.22 a.m. up London-Yarmouth trains. The morning and evening express trains will have no further additions to their schedules, except the 5.30 p.m. from Liverpool Street to Norwich, which is allowed 7 min. more to Ipswich and 4 min. more to Norwich; normal times also will apply throughout the day on Saturdays. The Sunday service between London and Norwich will be slowed by about half-an-hour each way.

On the London, Tilbury & Southend Line, to facilitate the electrification work by reducing the frequency of the trains, except on Saturdays, the hourly fast service is being temporarily withdrawn during the off-peak hours with the exception of the 7, 8, and 9 p.m. from Fenchurch Street to Shoeburyness and the up trains at 3.40, 4.40 and 5.40 p.m.

## Statistics for Six Months of 1960

(By a correspondent)

**N**O. 7 of *Transport Statistics* credits British Railways with earning £5,699,000, or 8 per cent, more passenger revenue than in 1959, though they carried 7,879,000, or 1.6 per cent, fewer people. The explanation is that on an average a second class passenger paid about 3d. more for a ticket than in 1959, while a first class passenger was charged 2s. extra. Compared with the first half of 1958 the number of passengers was down by 31,743,000, or 6 per cent, and 1958 was well behind 1957. It is also worth noting that 32 per cent of this year's journeys were made by season ticket holders; in 1958 the percentage was 29 and in these times of short working hours and longer holidays newcomers are not likely to travel 600 times a year to conform with an archaic statistical formula.

During the six months to June 30 all Regions reported large decreases in the issue of tickets at full fares and of early morning tickets. The Southern Region increased bookings below the standard fare by no less than 78 per cent, while the Eastern had an advance of 38 per cent. These Regions also had the largest influx of season ticket holders. On the other side of the account, the Western Region lost 3,109,000 passengers (6.2 per cent), the North Eastern 1,142,000 (4.2 per cent), the London Midland 2,404,000 (2.2 per cent), and the Scottish Region 803,000 (2.6 per cent). The introduction of diesel multiple-unit trains has not saved any of these areas from the general decline. These results are far from justifying an optimistic view about the future development of passenger travel.

The statistics for freight traffic in 1960 cover 28 weeks to July 17. Over that period revenue from freight train traffic rose by £2,000,000, or 1.4 per cent. For four weeks to July 17, freight receipts were £526,000, or 2.8 per cent, higher, but the rate of increase fell back to 1.4 per cent in the next four-week period to August 14. The additional revenue can hardly remunerate the railways adequately at a time when operating expenses are abnormally heavy. Railroading, as the Americans say, is a volume affair and British Railways are not securing the tonnage they need for economical handling. In four weeks to July 17 they originated 18,087,000 tons. That was an increase of 999,000 tons, or 5.8 per cent, on 1959, the poorest year in recent railway history when forwardings were 928,000, or 5.1 per cent below the feeble year 1958.

Compared with the June-July period of 1953, this year's merchandise carryings were down 741,000 tons (19.5 per cent), minerals down 395,000 tons (7.8 per cent) and coal class traffic down 2,977,000 tons (22.2 per cent). In 1953 the railways worked 1,742 million ton miles; this year 1,346 million ton miles sufficed, a difference of 22 per cent. Obviously much of the splendid property of our railways is not being used to anything like its full capacity. The table below gives, in millions, tonnage and ton miles for the first 28 weeks of 1960 and the three previous years; it points to slow progress in recovering much of the traffic lost since 1957.

Year	Tons	Ton miles
1957	153	11,775
1958	139	10,498
1959	127	9,644
1960	135	10,099

And yet we hear that it may be difficult for our railways to move some coal this winter, though output has fallen about 6 per cent!

## LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

### Vertical Curves

September 2

SIR,—Mr. N. J. B. Alexander in today's *Railway Gazette* raises the question as to why the radius at a sag curve should be twice that at a summit. Apart from limitations imposed by the length of rigid wheelbase of the locomotives, there appears to be no logical reason for this; in fact, considerations of sighting distance would seem to warrant the opposite rule.

But the most interesting aspect of the matter is the use of the term "radius," thereby tacitly accepting the use of the circle for vertical curves. For high-speed routes, the transition curve is the more desirable, and the use of the criterion "constant rate of change of gradient" leads to the parabola, as compared with the cubic parabola on horizontal transition curves. Many administrations now use this, as it has several advantages, including: (1) a form of transition for high-speed routes; (2) the mathematics are simpler than in the case of the circular curve; (3) the readings necessary for giving levels on the ground arise directly out of the calculations; (4) the figures in (3) are exact, no approximations being necessary; and (5) the sighting distance is easily calculated in the case of a summit.

In the case of marshalling yards, refinements are unnecessary on account of the low speeds, but the simplicity of the parabola would appear to make its use desirable in all cases.

Yours faithfully,

A. W. T. DANIEL, A.M.INST.C.E.  
Senior Lecturer in Civil Engineering

Queen Mary College, London, E.1

### The Waterloo-Hounslow Line

August 29

SIR,—From Mr. L. A. Mack's letter in your August 26 issue, it would seem that he has either not read or fully comprehended my earlier letter published on July 15, detailing the potential traffic and non-competitive fares on this line. Nevertheless he will find that the district is very much residential, despite the odd sports field, and that it deserves a far better train service.

Mr. Mack should also be made aware of the fact that there is not in the whole of London, as far as I am aware, a service running at the same frequency as that on the Hounslow line. Admittedly, some off-peak services do drop to Hounslow frequency, but where are the lines without a single additional up train in the morning peak period? I have been in the position where, by travelling by the Southern, I could get to the office 20 min. early or 15 min. late, but at no intermediate time. Mr. Mack apparently does not consider this to be inconvenient timing.

The evening service can only be described as quixotic: there is one extra train before the peak traffic starts; a second after it has finished; and a third train which runs at about the right time but in the opposite direction to the flow of traffic at that time of the day.

Possibly Mr. Mack has a personal interest in this correspondence, fearing that if the Southern Region increased the Hounslow line peak-hour up service from two to, say, three or four trains an hr., he might have to endure the unsufferable inconvenience of having only 10 or 11, instead of 12, trains from Twickenham.

Yours faithfully,

A. E. DURRANT

7, Spencer Road, Chiswick, London, W.4

### Southern Region Electric Stock

September 2

SIR,—The Southern Region engineers are just as dissatisfied as Mr. C. M. Jungdorf, whose letter is published in your August 26 issue, with the riding qualities of the new Kent Coast trains, and indeed with that of all our multiple-unit trains, including the diesel-electrics.

The standards were only "accepted" in the first place in the sense that there was nothing better. The Commonwealth bogie was not yet available; the Gresley double-bolster bogie was unsuitable for reasons which I shall explain.

Making any multiple-unit stock ride well is of course complicated by the condition of lateral instability entailed in riding at speed while being pushed (and intermittently pulled). But in the Southern Region there are a number of local factors involved which, in addition to presenting very special difficulty for the designer, also inhibit his freedom to deal with the problem as a whole.

Among these are: (1) The necessity—learned through experience—of ensuring that the bogies will stand up to particularly hard wear; (2) the state of the track on our intensively-used lines, which is likely to be worse than elsewhere on British Railways, despite the most efficient maintenance techniques; and (3) what is, perhaps, the most potent factor affecting bogie performance on the Southern—the severely restricted clearances at a number of places.

As all our multiple-unit stock must be able to run anywhere in the Region, this last consideration means that the permissible displacement of the suspension is far smaller than on similar stock elsewhere on British Railways.

This explains why the Gresley bogie, whatever its ability to cope with the first two problems mentioned, was completely unacceptable to us. It requires a displacement of at least twice that which we can tolerate. Even the Commonwealth bogie, which is being fitted to our Phase 2 Kent Coast electric trains, suffers a considerable loss of performance when modified to meet our requirements.

It is an undoubted improvement, but the complete solution, which can and must be found, requires a great deal more hard work and, I am afraid, it must result in trial and error on the full scale.

Yours faithfully,

F. D. Y. FAULKNER,  
Public Relations Officer

Southern Region, British Railways,  
Waterloo Station, London, S.E.1

### No Steam Haulage in the U.S.A.

August 27

SIR,—Your issue of August 26 recorded the slow progress of the German Federal Railway in getting rid of steam haulage. In contrast the U.S.A. Class 1 railroads took only 12 years to eliminate the stock of 35,108 steam locomotives in service at the end of 1947. In addition the railroads then owned 5,772 diesel-electric, and 821 electric units, making a total fleet of 41,701 units. At that time, 13 years ago, there were no gas-turbine locomotives in traffic.

By 1948 the more enterprising U.S.A. lines were convinced that diesel traction was more adaptable and economical than either steam or electric haulage. The upsurge of the diesel began with the installation of 2,350 units in that year and the retirement of 2,449 steam locomotives and 18 electric units. At the end of last year only 754 steam locomotives were left, and almost all of these were either stored or unserviceable. The railroads thus began 1960 with an active fleet of 28,163 diesel units, 511 electric units, and 37 gas-turbine locomotives, a total of 28,711 units, 13,008 (or 31 per cent) fewer than were in service at the outset of 1948.

Over these 12 years the railroads never had a higher operating ratio than 80.32 per cent in 1949, when labour troubles spoiled industrial output. Though 1959 was not a good year, the operating ratio was held down to 78.42. Without the widespread adoption of diesel traction and its efficient handling, there would not have been the continual improvement in railroad operating statistics on which you have commented repeatedly.

Yours faithfully,

R. BELL

Clacton-on-Sea



## THE SCRAP HEAP

### A Dog's Day

A stray dog dislocated services on an underground line of the New York City Transit System and caused a train collision in which 12 people were hurt. It jumped on to the line during the morning peak and wandered in tunnels until its capture 2 hr. later. Many trains had to slow down to avoid hitting the dog, and the timetables of all lines were dislocated. The collision occurred when one train slowed down to avoid the dog and a train behind ran into it. Finally the dog was caught and handed over to the Society for the Prevention of Cruelty to Animals.

### Grand Central Station, London

From time to time—generally, it must be admitted in the silly season—discussions arise in the Press regarding the desirability and feasibility of constructing somewhere in the heart of the Metropolis a great railway centre—a gigantic terminus, which would serve as a hub for the systems of trunk lines radiating to the North, South, East, and West. Naturally there is always complete unanimity as to the desirability of some such scheme. Our means of communication like Topsy, has simply "grown"; as a rule, there has been complete absence either of determination or power to bring all the great "spokes" to a converging point.—*From "The Financial Times" of August 23, 1900.*

### Ichabod—Ludgate Hill

Memories of former glories are recalled by the view reproduced, which has been made possible through the recent demolition of buildings in Queen Victoria Street next to *The Times* office. This has revealed a new view of the remains of Ludgate Hill Station. The walls which supported the original span roof, and also the rusty steelwork of the later umbrella-type platform roofs may be seen. Below are the arches still occupied as warehouses in Blackfriars Lane (formerly Water Lane), by Spiers & Pond Limited, the firm responsible for the catering at the once-famous Ludgate Hill Station restaurant, when, in late Victorian and Edwardian days, it was a well-known City rendezvous. The firm became associated as caterers with the London, Chatham & Dover Railway in the 1860's, and retained that connection with its successor, the Southern Railway, until December 31, 1930. Ludgate Hill Station was served by the only railway with underline bridges in the City of London. It was opened as a temporary station on December 21, 1864, with the extension of the line from Blackfriars; the permanent station was opened on June 1, 1865. The railway was further extended to Farringdon Street on January 1, 1866. Before the advent of the motorbus, trains of many railways converged on Ludgate Hill, including Great Northern, Midland, and London & South Western, besides L.C.D.R. Great Northern trains were discontinued from October 1, 1907, and the other "foreign" trains ceased in the next few years, as roundabout

railway routes lost popularity to the motorbus. The Ludgate Hill to Farringdon Street link was closed to all passengers on June 1, 1916.

### Enginemen's Generosity

When motive power staff of sheds at Kentish Town, Cricklewood, Neasden, Bedford, and St. Albans, in the London District of the London Midland Region, British Railways, drew their back pay under the award of the Guillebaud Committee they collected and sent nearly £60 to the St. Christopher's (Railway Servants') Orphanage, Derby.

### Recruiting for Indian Railways (1860)

I have to inform you . . . that it is not necessary to apply to this country for a person to fill such a situation [carriage painter]. I beg again to draw your attention to the importance of checking applications for assistance from this country when the necessary aid can be obtained in India.—*From a dispatch dated May 22, 1860, from the Secretary of State for India to the Government of Bombay.*

### Nothing New Under the Sun

How often does an invention make an obscure public appearance, and is then forgotten for many years! To a non-scientific layman it is always remarkable. . . . Lately public radio-telephones on railway trains have been in and out of the news . . . but in the late 1920's it was possible to talk by telephone on an ordinary train between Berlin and Hamburg for the economical charge of three marks. . . . In the summer of 1907, in an express train travelling from Salt Lake City, Utah, to Ely, Nevada, a telephone switchboard was set up, and passengers made calls to both terminal points. Contemporary pictures show the "Bell" sign, so familiar in the United States, over the girl operator, who kept

in touch with both Salt Lake City and Ely throughout the 250-mile journey without any difficulty at all. And what was the sequel? Nothing. Telephones weren't installed on American trains. Perhaps the incident was noticed in England, or it may have been only coincidence, but a Birmingham inventor, Hans von Kramer, some years later introduced his own system of railway telephones. This invention was radically different, as it required the equipping of transmitting and receiving stations with copper wire. Still, it was successfully tested by the London, Brighton & South Coast Railway in June, 1910, and "opened" at the Stratford-upon-Avon station by Marie Corelli on April 20, 1911.—*From "The Times."*

### Train-Spotting Tactics

Train-spotting, in the view of a boy at Crewe Station, was never so much fun until it was banned. "I think they done it on purpose," he said, "'cos there was less of us coming. I mean, with us paying fares to come here, it's all lolly for the railways, isn't it?" His economics were straightforward: now that it was more exciting because officialdom disapproved, there would be more train spotters and more fares would be paid. . . . It seemed that the railways would prefer not to have the boys at all, except in organised parties from schools. A move to compromise with this view has come from the spotters. On Saturday three of them brought their mothers, who sat placidly knitting. They provided an air of respectability and shelter, although one furtively entered numbers in her own book. Other boys, seeing this, soon adopted the "mums." At the end of the day it appeared to passers-by that these women were exceedingly blessed.—*From "The Manchester Guardian."*



South end of Ludgate Hill Station from Upper Thames Street

## OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

### INDIA

#### New Railway Pay Scales

Publication is awaited of the revised scales of pay for employees of the Government Railways, discussed recently by the Railway Board and the National Federation of Indian Railwaymen.

#### Thirty-day Return Tickets

Return tickets, first, second, and third class, valid 30 days, at one-and-a-half single fares, are being issued until September 15 between stations not less than 300 miles apart. Break of journey is allowed on the outward but not on the return journey.

#### Escalator for Delhi Main Station

India's first escalator is expected to be installed later this year at the Delhi Main Station. Designed entirely by Indian railway engineers, fabrication work on the escalator is already in progress at the Northern Railway Workshop at Amritsar. The escalator is to be fitted at the Ghaziabad end approach from the third class waiting hall to connect with the foot-overbridge to facilitate quick dispersal and movement of passengers. Half of the approach will be served by the escalator and the other half by stationary steps.

### SOUTH AFRICA

#### New Livery for Passenger Stock

A two-tone colour scheme for the exterior painting of all passenger saloons on the South African Railways is being adopted for the future. In the case of the existing Reef electric sliding-door coaches and the sliding stock on order for the Reef and the Cape, the colour scheme will be a gulf red band running longitudinally from the bottom of the coach body up to the windows; light grey between the windows, but with the whole of the doors light grey; gulf red band above windows for full length of the coach; and the roof in aluminium. The same colour scheme will be applied in future to other stock as well, but for main-line stock and the swing door type of suburban stock the three band design will be applied throughout including the doors.

### RHODESIA

#### New Passenger Stock

Rhodesia Railways will soon be calling for tenders on a world-wide basis for 40 passenger coaches. Fifteen will be for third class passengers and 25 for fourth class. A new feature in the fourth class coaches will be centre doors on both sides in addition to the usual end doors. This will speed the entry and exit of passengers, many of whom travel with bulky parcels. Each new fourth class coach will seat 96 passen-

gers, and the seats are to be constructed from glass fibre instead of the wood slatted type in existing stock. Glass fibre will also be used for the toilet fittings. The interior of the coaches will be panelled with Formica or some similar material.

During 1958 24 new fourth class coaches were placed in service at a cost of some £13,000 each. The third class coaches will have a similar layout to those placed in service in 1951 except that the interior finish will be of colourful and easily cleaned materials.

### VICTORIA

#### Two-tier Motorcar Wagons

The first of eight new two-tier rail wagons designed by railway engineers to carry motorcars is now ready for traffic. They are being built at Newport Workshops. Constructed to take six large vehicles or eight small ones, each wagon has steel sheeting protecting the sides and roofs of the motorcars carried on the lower deck. Cars will be loaded up a ramp on the end wagon, and then along the train, with plates bridging the gap between the wagons. This arrangement of connecting several wagons by plates will also speed unloading. Another feature of the new wagons is the locking bar method of keeping the motor car in position during transit. Designed for quick fastening and release, these bars have been successfully tested in practical operation on a prototype wagon.

### NEW ZEALAND

#### Conversion of Royal Train Stock

Two of the three cars of the Royal train used during the visit of the Queen and the Duke of Edinburgh have been converted to holiday homes for railwaymen at Arthurs' Pass in the Southern Alps region. The luxury sleeping cars, worth more than £5,000, have become obsolete as railway units by changing travel trends, but lifted from their bogies and set into concrete foundations in the alpine National Park they will become the second of the New Zealand Railway Welfare Society's holiday camps to be established in the South Island. Since the Royal tour, the two units have been in use as the South Island Vice-Regal car and the General Manager's car.

A third unit, that occupied by the Queen in 1954, has been retained by the Railways Department and will be kept in service for the use of the Minister of Railways.

### JUGOSLAVIA

#### Knin Line Operation

Before the 1939-45 war the line inland from the Adriatic coast at Split to Knin, and thence on to Ostarje and Ogulin on the Zagreb-Susak line, did not carry a great deal of traffic, which was fortunate, as the line is steeply graded, sharply curved and has other physical disadvantages such as rock falls. During the last three or four years Split has been



Photo]

[A. E. Durant

A 2-6-6-0 Mallet with Brotan boiler approaching Kastel Stari on the Knin-Split line of the Yugoslav State Railways



developed into the principal Yugoslav port, and large tonnages of import and export traffic now have to be moved over this route, for there is no other serious means of inland transport. As a first step heavier rails had to be laid, for the limiting axle load for the steam units was about 16 tons, and as a rule 2-6-6-0 Mallet engines from the old Hungarian State Railways were employed. But a year ago 20 General Motors 1,950-b.h.p. Co-Co diesel-electric locomotives with an axle load of 18 tons were put into traffic between Split and Knin, and have improved the whole operation of the route so that all traffic can now be handled expeditiously and without double-heading. A visit to the line in July showed only one steam Mallet still in traffic, as shown in the illustration on page 300, which also shows the new flat-bottomed rails and rock ballasting. A new U.S. loan of \$14,800,000 to Yugoslavia was sanctioned in May for the purchase of more of the same type of diesel locomotive, so that all traffic between Split and Zagreb would be turned over to diesel haulage, and diesel locomotives provided for certain other routes. The number of these 1,950-b.h.p. G.M. locomotives to be bought with the new loan has been given as 59 in U.S. reports and as 57 by Yugoslav reports.

## WESTERN GERMANY

### Brunswick Station

The first stage in the new main station at Brunswick on the German Federal Railway is to be brought into operation on October 2, and will include all the four platform groups and the major parts of the complete track re-arrangement in the Brunswick area; the new station is of through type, whereas the old main station was of the terminal type. Brunswick is said to be the major station reconstruction undertaken by the Federal

Railway, partly because an entirely new station on a new site was sanctioned, and in these respects the work exceeded that needed by the new station at Heidelberg. Inter-platform communication at Brunswick is by subway; at Heidelberg it is by over-bridge.

## EASTERN GERMANY

### Prison Sentences for Railwaymen

The district court of Leipzig has jailed four East German railwaymen held responsible for the Leipzig train accident of May 15 in which 54 people died and 200 were injured. They were found guilty of neglecting security regulations. One man was sentenced to 15 years, one to 12, and two to eight years.

## PORTUGAL

### Locomotive Falls into River

The locomotive of a passenger train plunged into the River Ceira, five miles from Coimbra, on August 23, after it had collided with a lorry on a bridge. Two people were reported dead, and about 50 injured. The locomotive crashed through the parapet of the bridge and fell about 92 ft. into the river, after which it caught fire. The first carriage was almost completely destroyed, and was left hanging from the bridge over the river.

## IRAQ

### Baghdad-Basra Standard-Gauge Line

The agreement on the U.S.S.R. loan to Iraq for construction of a standard-gauge line from Baghdad to Basra, provides for 48 Russian technical staff to assist the Iraqi Republican Railways. Reference to this project was made in our August 26 issue.

## UNITED STATES

### Pennsylvania Railroad Strike

The Pennsylvania Railroad was shut down at midnight on August 31 by a strike of 20,000 of its maintenance and repair men. The strike followed the breakdown of negotiations for a new contract to end a three-year dispute between the company, the Transport Workers' Union, and an organisation of machinists, over job security and other points of contention. The company has asserted that these demands would cost \$3,000,000.

### Philadelphia Subway Line Modernisation

The first of 270 new stainless-steel cars being built by the Budd Company for the Philadelphia Transportation Company at a cost of nearly £9,000,000 are now going into service on the 12-mile 5-ft. 2½-in. gauge Market-Frankford subway-elevated route. They will replace the whole of the 315 cars now in use, 215 of which are 53 years old. This is the first really substantial order ever to be given for stainless-steel subway cars.

Forty-six of the cars will be single units with driving positions at both ends and the remainder will be coupled permanently in pairs. The top speed is limited to 55 m.p.h. because of the short distance between stops, but trains calling at all 26 intermediate stations will cover the 12 miles in 38 min. instead of 45 min. as at present. In peak hours many trains will call only at alternate stations on the "skip-stop" principle to give better timings.

Other improvements to the Market-Frankford route include the renewal of part of the signalling system, the cleaning of the subway sections and repairs to the elevated structure, replacement of much of the track and ballast, re-lighting of stations, and improvements to the power distribution system.

## Publications Received

*Railway Works Construction.* By H. M. Pearson. London: Odhams Press Limited, Long Acre, W.C.2. 8½ in. x 5½ in. 304 pp. Illustrated with photographs and diagrams. Price 35s.—One of the most notable features of this work is the coverage of every aspect of railway civil engineering, including some not usually included in such works, and its clear and simple explanation of each. As a textbook on the construction, repair, and maintenance of railway civil engineering and building works it is of value to all grades of railway and contractor's works staff. The author is an experienced engineer and lecturer. The lucid way in which he deals with modern practice, with concrete examples, makes it a valuable aid not only to the student and the improver but also to the senior engineer and executive who may be slightly out of touch with first principles. The application of mathematics and hints on sketches and drawing work are followed by descriptions of a wide range of materials and their characteristics and the behaviour of all kinds of structures

and their foundations. There is a helpful review of structural deterioration, such as fatigue, and other defects linked with inspection and protection measures. Later, Mr. Pearson turns to the preparation of works programmes, work-study, job-analysis and the handling of emergencies, all vitally instructive. Equally so are chapters on safety measures of all kinds, running and fixed clearances, and on pre-stressed and other concrete construction. The preparation of estimates, specifications and reports upon investigations are suitable subjects to conclude this well-illustrated and well-produced work. Mr. J. S. Campbell, Assistant Civil Engineer (Works), British Transport Commission, contributes a foreword.

*Philips Stud-Welding Equipment.*—Research & Control Instruments Limited has issued a new leaflet (RCL 5909), covering Philips stud-welding equipment. It gives the latest information about apparatus, and accessories available, the main features of the technique, and illustrates a typical application. Copies of the leaflet are obtainable from Research &

Control Instruments Limited, Instrument House, 207, Kings Cross Road, London, W.C.1.

*The Electrician's Mate.*—This booklet, published by British Insulated Callender's Cables Limited, has been specially designed and edited to give a comprehensive coverage of mineral-insulated cable work. It is intended, primarily, for those people who actually carry out the installations, and in consequence it has been produced in pocket size. Copies of the publication are available at all B.I.C.C. branch offices.

*The Nickel Bulletin, July 1960.*—This 184-page booklet, published by the Mond Nickel Co. Ltd., comprises abstracts which provide, by the diversity of their subject matter, an illustration of the wide range of industries and applications in which nickel is extensively used. Among other items, reference is made to heat and corrosion-resisting materials, service experience with "Nimonic 80A" turbine blades, the properties of a nickel/mullite high-temperature bearing cermet, and to the production and properties of sintered stainless-steel parts.

## Miniature-Buffer Cars for British Railways

*Open saloon seating for 44 passengers with buffet offering bar service and light refreshments*



*Buffet compartment, showing spacious appearance resulting from use of identical panels for body-side and flat ceiling*

**R**ECENT deliveries from the Wolverton Works of British Railways, London Midland Region, include 20 miniature-buffer cars. These vehicles will be operated by all Regions, and the latest allocation includes 20 cars for the Scottish and 12 for the London Midland Regions.

They have a body length of 6 ft. 6 in., and length over solebars of 63 ft. 5 in., curved body sides with a maximum width of 9 ft., a height of 12 ft. 4½ in., and a floor level 4 ft. 3 in. above rail.

The cars have the buffet section near the centre of the length; at one end of this is an open saloon with 16 seats and at the other end is an open saloon with 28 seats, with tables between facing pairs. The second class type of seat is provided, and these seats are allocated as ordinary passenger accommodation.

### Layout of Accommodation

The two open saloons are connected by a straight-through full-width aisle running through the buffet section.

Behind the seats the end partitions of these saloons are unglazed, but the centre partitions butting on the buffet section are fully glazed.

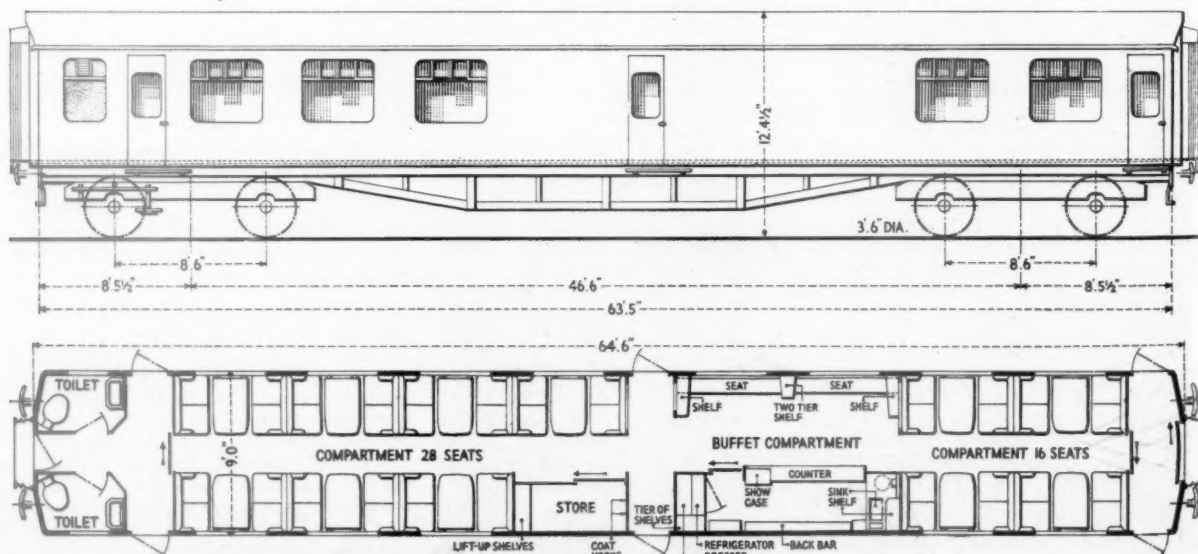
In the buffet compartment, which is 12 ft. 6 in. long, is a full length narrow seat below the windows at one side, with a grab pole at each end and in the centre. A single guard rail is fitted across each of the two windows. Shelves and litter bins are fitted on the end partitions and a two tier shelf attached to the centre grab pole.

### Buffet Serving Area

The serving area of the buffet front, fitted with a rectangular surround, is sealed by three hinged shutters. These are hinged at counter level and in the open position hang vertically in a framed recess to form the counter front. Inside locking is provided for each shutter to afford security and give a clean appearance on the outside. Entrance to the inside of the buffet is by a sliding door at one end of the counter. A Hall refrigerator is fitted in the recess behind the door and the remainder of the recess occupied by fitted shelves and cupboards.

Across the opposite end of the buffet is a Stott combined boiler and sink unit. The boiler uses propane gas; it also supplies heat for a pie warmer and an egg-boiler. The recess in which this equipment is fitted is lined with ½-in. sheet asbestos and faced with stainless steel sheet. Water for the boiler and sink unit is carried in a roof-mounted 85-gal. tank.

The back bar, fitted with concealed lighting, is fully equipped for the display and storage of wines, spirits, and soft drinks. At the end of the counter, near the doorway, is a Still glass showcase



*Side and plan elevation of miniature-buffer cars, showing principal dimensions and layout*



illuminated by a spotlight in the ceiling, and below the counter are fitted shelves. The floor behind the counter is covered in aluminium treadplate.

Bulk supplies for the buffet are carried in an adjacent storage compartment. This compartment, which is provided with a number of fixed and hinged shelves, is lined up to waist height with stainless steel sheet. The floor is covered with aluminium plate, with extruded aluminium section coving. Ventilation is by one Imperiston roof extractor fan behind the counter and two combined lighting and extractor fan units on the passenger side.

### Décor

Two schemes of décor, for which Mr. Peter Miller was the consultant, are used for the buffet, in each of which a spacious effect is obtained by the use of identical panelling for the bodyside and for the ceiling.

An impression of width is also given by the flat ceiling. All plastic panelling is in semi-matt Formica. In Scheme 1 the bodyside and ceiling panels are in Pantomime lime green, with dove grey partition panels. The counter surround is polar white and the shutter panels Pompadour blue-green. Timber finishings are in lacewood.

In Scheme 2 the bodyside and ceiling panels are in Pompadour dove grey and the partition panels in Pantomime blue/white. The counter surround is polar white and the shutter panels Decorplast Hopscotch. Timber finishings are in sapele mahogany. In both schemes the green marble linoleum is inlaid with 2 in., 4 in., and 6 in. squares of black. Metalwork is finished in satin matt chrome. The covings are covered with green marble linoleum.

The fixed type seat units in the saloons are of timber frame construction with polished lacewood seat ends. On the gangway side the arm-rests are covered in p.v.c.

Seat cushions and squabs, covered

in uncut moquette, are fully sprung and hair filled. The tables are covered in Vynide and the supports anchored in rubber bushed sockets. All windows are double-glazed.

Ventilation is by standard type Air-Vac roof vents and general lighting by a single row of shallow dome light fittings.

The saloon floors are covered in marble pattern green linoleum. Sheet metal pressings carried on cast aluminium brackets are used for the continuous type parcel racks. The front edge of the racks is covered in p.v.c. to match the table tops, and attached to the underside of the rack, above each table, is a small electric light fitting. To conceal the fixing screws, the ceiling panels are held in a double flange aluminium moulding.

### Interior Panelling

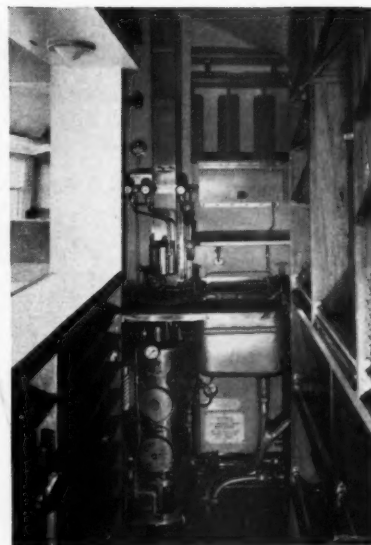
The plastic panels for the saloon ceiling of the Scheme 1 décor are Wareite Tessuto pearl grey, and this finish is also used for the bodyside soffit panels. For the bodyside quarter panels Formica Tapestry sky blue is used. Solid timbers and timber veneers are in lacewood. Anodised satin silver is the finish used for all metallic fittings.

For the Scheme 2 décor the ceiling and bodyside soffit panels are in Wareite Tessuto primrose and the bodyside quarter panels in Formica Tapestry dove grey.

Solid finishing timbers are sapele mahogany and timber veneers in striped sapele. The anodised finish of all metallic fittings is satin pale gold. The moquette seating upholstery for Scheme 1 is black and white fleck with black stripe and for Scheme 2 charcoal grey and black mixture with turquoise stripe.

### Heating

Provision has been made for the use of either electric or steam heating, the electric heaters being fitted under the seats and the steam heaters along the body side below the windows. Heating



*Service side of buffet counter, showing Stott's propane gas boiler in recess lined in stainless steel*

controls for passenger use are fitted near the vestibule partitions.

Adjacent to the vestibule at one end of the car are two toilet compartments. The water supply for these is carried in two roof-mounted tanks with a combined capacity of 120 gal.

### Body and Underframe

The car body is of British Railways normal all-steel welded construction. The 16 s.w.g. panels are carried on  $\frac{1}{4}$ -in. top-hat and Z-section pillars and rails. Fibreglass is used for the bodyside, floor, and roof insulation. The floor insulation is laid on corrugated aluminium sheet and covered by a multi-ply timber floor. Beclawat drop lights are fitted in the three light-alloy carriage doors on each side. The underframe is of the British Railways standard light type, mounted on double bolster bogies fitted with compensated brake gear. Lighting and battery charging is by a Wolverton type belt-driven dynamo.

Sub-contractors include the following:

Window equipment	Beckett, Laycock & Watkinson Limited
	Hallam Sleight & Cheston Limited
Plastic panels	Holoplast Limited
	Formica Limited
	Wareite Limited
Fibreglass insulation	W. Gilmour Smith & Co. Ltd.
Boiler and sink unit	James Stott & Co. Ltd.
Electrical equipment	J. Stone & Co. (Deptford) Ltd.
Refrigerator	J. & E. Hall Limited
Vynide covering	I.C.I. (Hyde) Limited
Moquette seat covering	J. Holdsworth & Co. Ltd.
Parcel racks	T. F. Firth & Co. Ltd.
	James Gibbons Limited
	Precision Engineering Co. Ltd.



*Saloon seating 28, looking towards buffet, showing plate type parcel racks and table lights attached to underside of racks*

**ESSEN EXHIBITION.**—From September 10 to 25 a Land Transport (Rail and Road) Exhibition is being held in Essen. Leading exhibitors include the German Federal Railway, German Post Office, private railways, municipal transport organisations, and builders of equipment. Small exhibits and models are to be on show under cover; but a comprehensive range of rolling stock and other items is to be on view outside, including the first of the new V.160 diesel-hydraulic 1,900 b.h.p. locomotives of the German Federal Railway.

## Combined Rail-and-Road Vehicles for British Railways

*Semi-trailers, each with tubular-steel backbone and twin wheel sets, to form articulated train for the efficient handling of door-to-door traffic*



*Prototype Roadrailer vehicles coupled to leading adapter bogie on which superstructure can be rotated to suit direction of travel*

Transit is then by fast trunk rail service to the nearest or most suitable destination terminal, where the transfer from rail to road operation takes place. Conventional marshalling is eliminated as single vehicles can be withdrawn from, or inserted into, any part of the Roadrailer train.

### Alternative Bodies

On the two prototype vehicles the bodies are of the end-loading container type with a pay-load capacity of 11 tons. Designs are in hand for a range of body types, including tank wagons, tippers, motorcar-body trailers, and flat wagons.

Leading particulars of the prototype vehicles are as follow:—

Gauge	...	...	...	...	ft. in.
Gross weight	...	...	...	...	4 8½
Payload	...	...	...	...	16 tons
Volume of loading	...	...	...	...	1,400 cu. ft.
Maximum speed	...	...	...	...	70 m.p.h.
Minimum curve negotiable	...	...	...	...	2½ ch.
Length over body	...	...	...	...	ft. in.
Overall length	...	...	...	...	24 7½
Width	...	...	...	...	26 11½
Height inside container	...	...	...	...	8 0
Braking on rail	...	...	...	...	8 2
Braking on road	...	...	...	...	Vacuum, three stage Compressed air

Each of the wheel sets can be lowered as required for running on road or rail. The rocking beams, one at each side, are attached to a Torsilastic cross-shaft, which is pivoted by a centrally mounted forked lever. Movement of the lever is by a motor-driven screw pulling or pushing on a nut anchored in the fork end.

### Jacking Mechanism

The jacking mechanism is a Rotax actuator. It consists of a reversible air motor driving a case-hardened steel screw. The running nut anchored in the forked lever is of the high-efficiency recirculating-ball type. The screw is silver-plated to prevent corrosion. A special form of overrun stop is fitted at each end.

AFTER an extended period of development testing a combined road and rail freight vehicle, the Roadrailer, is being demonstrated to railway managements, road transport operators, and transport users. It was built by the Pressed Steel Co. Ltd. at Linwood works, Paisley.

The basic idea was conceived independently by both British Railways, Eastern Region, and the Chesapeake & Ohio Railway Company from which a licence was obtained by the Pressed Steel Co. Ltd. This company was appointed as development contractor by British Railways to enable the required design modifications and construction to proceed, in co-operation also with British Road Services, to meet both road and rail conditions obtaining in this country.

### Improved Door-to-Door Service

The Roadrailer is intended to combine the flexibility and convenience of road transport in its collection and delivery functions, with the speed and economy of railways for the trunk haul. Although the load/tare ratio does not greatly exceed 2:1, the total equipment cost per payload-ton is less than either road or rail transport. This has been possible because the Roadrailer is basically a road-vehicle semi-trailer with the minimum of extra equipment to enable it to run on railways, rather than a modified railway vehicle.

Two sets of wheels, mounted on a rocking beam at each side, are fitted in tandem. Torsion springing is incorporated in the cross-shaft connecting the beams.

A maximum of 75 Roadrailers may be coupled to form a train, or they may be attached to the rear of other railway vehicles. Because it is a two-wheel vehicle, and special couplings are used,

an adapter bogie is necessary for coupling the Roadrailer to railway vehicles. When Roadrailers are coupled together, the rear axle of the leading vehicle supports, one third of the weight of the trailing vehicle.

Goods are collected from consignors in a Roadrailer hauled by a conventional road tractor vehicle and taken to the nearest rail terminal provided with transfer facilities. The transfer requirements are a supply of compressed air and a section of track with the ground built up to rail level.

The Roadrailer is driven into position over the track and the rail wheel-set and landing legs lowered. Coupling to the rear of another Roadrailer or to the adapter bogie is automatic on impact.



*Roadrailer in use as semi-trailer with rail wheels retracted and showing female half of coupling and road lighting equipment*



of the screw to prevent damage from overload. The air motor, mounted at right angles to the actuator screw, is of the sliding-vane type, fitted with an automatic brake and an overspeed regulator. Air at 80 lb. per sq. in. is admitted to the motor by a hand-controlled poppet valve.

#### Friction Brake

At the output shaft end of the motor is a spring-loaded friction brake. The brake pressure is released by a piston when air pressure is admitted to the motor. When the air pressure is cut off the motor is stopped instantly by the brake. The brake is also used to check the lowering speed during the first part of a transfer movement.

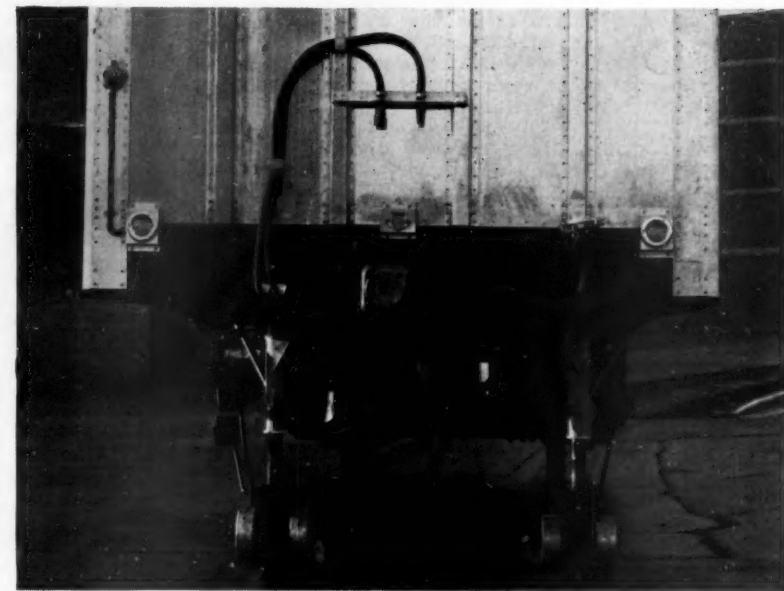
Maximum speed of the motor is limited to 5,500 r.p.m. by a fly-weight governor, arranged to restrict the air inlet orifice. The eccentric rotor housing is provided with two sets of inlet and exhaust ports. Movement of the housing changes the direction of the motor.

From the rotor the drive is taken through a quill shaft to a bevel gear unit. The latter incorporates an epicyclic reduction gear, the planets of which engage with a gear on the operating screw. The bevel gear provides a 5.85 : 1 reduction and the epicyclic gear a 3.54 : 1 reduction. A locking device prevents rotation of the screw when either the road or rail wheels are in the running position.

#### Rocking Beam

The rocking beam on which the wheel-sets are mounted is carried on a rubber torsion-spring assembly. The rubber is bonded to an inner and outer steel tube. The outer tube is attached to the beam and the inner to the forked lever which is positioned by the actuator.

With a travel of 18 in., the actuator rotates the torsion-spring assembly through an arc of 70 deg., and the load is then carried through the torsion spring to the wheels. In the event of ageing or permanent set of the rubber occurring



*Leading end of vehicle showing male coupling, vacuum hose, electrical connections, and landing wheels fully extended*

after a long period of use, the spring deflection would increase. This is readily counteracted and the correct floor height maintained by using the over-travel provided in the actuator.

Spring damping is by two direct acting hydraulic shock absorbers anchored to brackets on the torsion tube assembly and to the body cross-members. The lengths of the rocking beam arms carrying the rail and road wheels are proportioned to provide an approximately equal static deflection and actuator loading.

#### Rail Wheel-Set

The rail wheel-set of conventional form is carried in Timken taper-roller-bearing axleboxes, suspended by ball-and-socket-jointed swing links in a jaw of the rocking beam. This anchorage

permits, between the limit stops, a fore-and-aft movement of 1 in. and a lateral movement of 3 in.

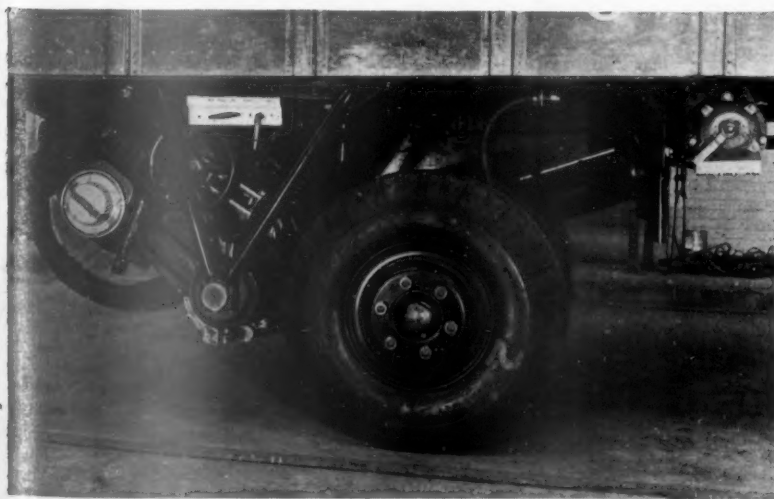
The rocking beam carrying the twin road wheels at each side is provided with a hinged joint which permits the road wheels, when retracted, to be isolated from the rail wheels. In the retracted position the wheel assembly is held firmly by a coil spring against the underside of the body. This eliminates the adverse effect of high frequency rail joint vibration on the road wheel bearings, and maintains the running clearance required between the road wheels and the rail.

The brakes fitted for railway operation are the Girling railway disc type, in which braking surfaces incorporated in the wheel webs are gripped between a pair of brake pads. Each wheel has an independent set of brake gear operated by its own vacuum cylinder. Manually-operated braking is provided for one wheel.

#### Three Stages of Braking

To cover variations in axle loading between tare, half laden, and fully laden conditions, three stages of braking are provided. For tare weight braking the right-hand side brake, powered by an 8-in. dia. vacuum cylinder, is used, giving a deceleration rate up to 2.04 m.p.h./sec. Braking for a half-laden vehicle is by a 10 in. dia. vacuum cylinder operating the left-hand side brake. This also gives a maximum deceleration rate of 2.04 m.p.h./sec. Both cylinders are used for the braking of a fully-laden vehicle, giving a deceleration rate up to 1.58 m.p.h./sec. as a maximum.

A weight indicator is attached to the end of the Torsilastic suspension spring and the three-position rotary selector valve on the underframe is set to give the correct braking in accordance with the reading shown. An important detail is that



*Vehicle running gear at off side showing rocking beam and suspension details, also actuating control levers*

when a Roadrailer is coupled as the rear vehicle of a train the axle-load is insufficient for braking. Therefore, a fourth position is provided on the brake selector to allow the brakes on this vehicle to be isolated.

The brake cylinders are of the diaphragm type, which eliminates the use of vacuum seals. Operation is through a sliding compact lever system incorporating an automatic slack adjuster to compensate for pad wear. A step is machined on the

carries all the buffing and draw loads, is threaded into the rear coupler as its only means of attachment to the vehicle. The coupling and centre sill have been designed to withstand 400,000-lb. buffing load and 250,000-lb. pull without over-stressing the material.

The body is supported on the centre sill through Cor-Ten steel cross-members, located at 24-in. centres and free to slide on the centre sill through nylon bushes. The cross-members transfer the load to

position the vehicle laterally. The single axle suspension of the Roadrailer necessitates a support for the coupling end when coupled behind a locomotive or standard railway vehicle.

A four-wheel adapter vehicle consisting of bogie and superstructure is provided for the purpose mentioned above. The bogie is of a conventional type with roller-bearing axle-boxes, semi-elliptic springs, and a manually-operated brake system.

Fitted at one end of the superstructure is a pair of standard buffers and screw link drawgear and over the centre of the bogie is a Roadrailer coupling socket. This position gives a balanced wheel loading on the bogie. The superstructure is mounted on a central pivot to enable it to be swung into position as required without using a turntable.

The coupling socket is provided with a ring spring draw gear to absorb the normal locomotive or train impacts. Above the coupling socket is mounted a counterbalance which brings the mass centre of the vehicle into the same vertical plane as the socket.

#### Compressed-Air for Transfer Motor

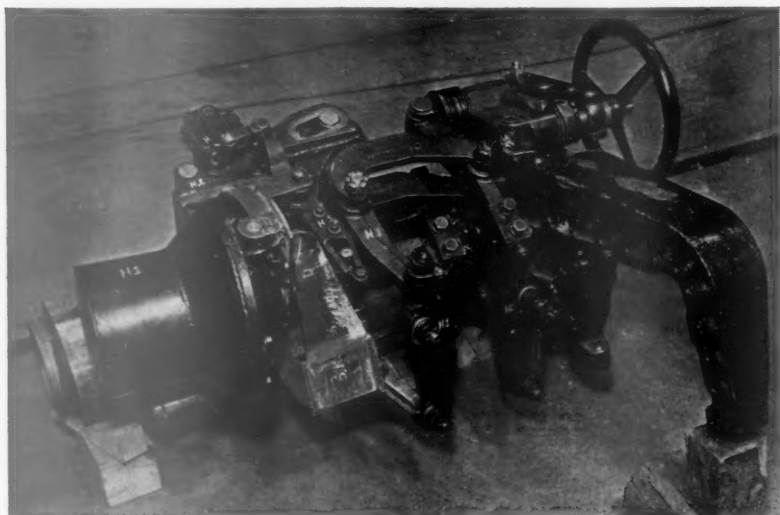
When operating at maximum output the actuator air motor consumes 120 cu. ft. per min. at 80 lb. per sq. in. This will be supplied at terminal points by a mobile compressor set. A self-propelled unit which has been designed for this application is a two-stage compressor powered by a two cylinder air-cooled diesel engine. Air is stored in a receiver at 400 lb. per sq. in. and supplied to the vehicle at 100 lb. per sq. in. through a reducing valve. The truck is driven by a series-wound electric motor, supplied by current from a generator driven by the engine.

At terminals where many of the Road-railers were to be dealt with a yard tractor would be used for road/rail transfers to speed up clearance of the road vehicles; in which case the compressor set would be mounted on the tractor.

An illustrated description of the original prototype Railvan of the C. & O. Railway was given in our April 26, 1957, issue. Under the licensing agreement, the Pressed Steel Co. Ltd. is free to supply Roadrailer vehicles to private transport operators, and to railways overseas, except in America.

#### Principal sub-contractors include:—

Actuator	...	Rotax Limited
Brakes and dampers	...	Girling Limited
Lighting	...	J. Lucas Limited
Landing legs	...	Davies Magnet Works Limited
Tyres, springs and wheel discs	...	Dunlop Rubber Co. Ltd.
Tyres	...	Avon India Rubber Co. Ltd.
		Goodyear Tyre & Rubber Co. Ltd.
Brakedrums and hubs	...	Alport & Alder Limited
Railway wheels	...	Owen & Dyson Limited
Vacuum-brake cylinders	...	Gresham & Craven Limited
Extrusions	...	High Duty Alloys Limited
Castings	...	George Blair & Co. Limited
Roller Bearings	...	British Timken, Division of the Timken Roller Bearing Company
Actuator bearings	...	Glacier Metal Co. Ltd.



*Girling disc-brake assembly and rocking beam dismounted to show eight-inch vacuum cylinder and compensated linkage*

brake pads to indicate the permissible wear limit. The pads are in a non-metallic friction material and the brake shoes are readily removable for servicing replacements. Brake reaction is transmitted through rubber bushed links to the underframe. The handbrake is applied by handwheel operation of a screw thread, and the brake capacity is such that the vehicle can be held on a 1 in 37 gradient by an effort of 67 lb. on the handwheel.

#### Braking of Road Wheels

Braking of the road wheels is by Girling two-leading-shoe brakes of the heavy road vehicle expanding type. The brake shoes are 12½ in. in dia. and 5 in. wide. They are mounted in pairs and operated by a compressed air cylinder. Roller tappets, with a readily accessible adjustment for lining wear, are operated by the normal wedge-type expander. The two-leading-shoe design provides a balanced servo action giving equal braking in both forward and reverse.

The air reservoir on the underframe is charged by a compressor mounted on the engine of the tractor vehicle. A relay valve is connected in the pipe-line between the air reservoir and the brake cylinders. This reduces the amount of air to be handled by the driver's control valve and also provides a means of making an emergency brake application in the event of a vehicle breaking away.

The main member of the underframe is a seamless-steel centre tube 5½ in. in dia. and 0.36 in. thick. This centre sill, which

the bodysides and provide column stability for the sill. With 12 deg. angular movement the coupler is of the plug and socket type, and is capable of supporting vertical and also draught loadings.

The ball joint plug portion is screwed and welded into the centre sill tube and the socket is a steel casting welded into the rear headstock. Engagement is automatic on impact and four retractable pins lock the plug in the socket. The pins are operated by a hand lever at the side of the vehicle.

A breakaway safety device has been developed which is designed to apply the brakes and support the trailing vehicle in the event of a coupling failure.

When the Roadrailer is separated from the towing vehicle the towing end of the unit is supported on two 16-ton jacks. These are of the conventional trailer pivoted type, with the addition of a hinged extension at the lower end.

#### Hinged Extensions

There is a variation of up to 14 in. between the height of the coupling connections of the road and rail vehicles and the hinged extension saves time by taking up the bulk of this difference without cranking the jack handle. The jacks are inter-connected for operation from the right-hand side of the vehicle.

The hinged road-extensions, which are counterbalanced, are fitted with aluminium landing wheels to permit limited movement of the road vehicle. On the rail foot of the jack, side plates are fitted which register with the railhead to

**ROUMANIAN TRAINS.**—A six-car 1,200 b.h.p. diesel-electric train has been completed at the 23rd August Works at Bucharest for the Roumanian State Railways. Intended mainly for the Bucharest-Constantza service, it has Ganz 600 b.h.p. engines.

## Signal Engineering for Main-line Electrification

*Modernisation of signalling and telecommunications in conjunction with electrification work in the London Midland Region*



*Operating room in Wilmslow signalbox, showing switch console with train describer and telephone equipment, and track diagram*

**I**N planning the new signalling and telecommunications work for the London Midland Region of British Railways, new technical problems associated with the introduction of high-voltage 50-cycles a.c. overhead electric traction had to be faced at the outset. The most important of these related to the protection of equipment and personnel from direct and inductive interference from the new traction system.

Before the adoption of this form of traction it had been the practice for many years to use 50-cycle current for power signalling installations, not only where d.c. traction existed as at Manchester London Road and between Euston and Watford but elsewhere, with the possible extension of d.c. traction in mind. With the introduction of a.c. electrification at the standard frequency a new code of practice had to be devised and applied not only to the new signalling and telecommunications schemes, but also to the existing colour-light and power signalling installations at Crewe, Liverpool Lime Street, and between Euston and Watford (local lines) which were being retained.

To safeguard signalling equipment from direct and inductive interference under normal full-load and traction fault conditions, track circuits have been designed to operate on d.c. or on a.c. at a frequency sufficiently removed from the standard frequency and its harmonics to eliminate the risk of false operation, i.e., 75 cycles or 83.1/3 cycles. Line circuits have been put in multi-core signalling cable with non-metallic sheath and sectionalised to limit induced longitudinal voltages to 430V. under traction fault

conditions. They are double cut (no common returns) and fed from a signalling supply totally insulated from earth. Signal control relays are located in the immediate vicinity of the signal, and signalling relays operating at 24 V. d.c. are designed to give immunity from 50-cycle a.c. up to 1,000 V. Electro-pneumatic point valves are immune from 50-cycles a.c. operation up to 1,000 V., and there is a similar degree of immunity for electric point machines. The air mains for e.p. point operation are of plastic material. Signal structures are designed to take account of traction wire

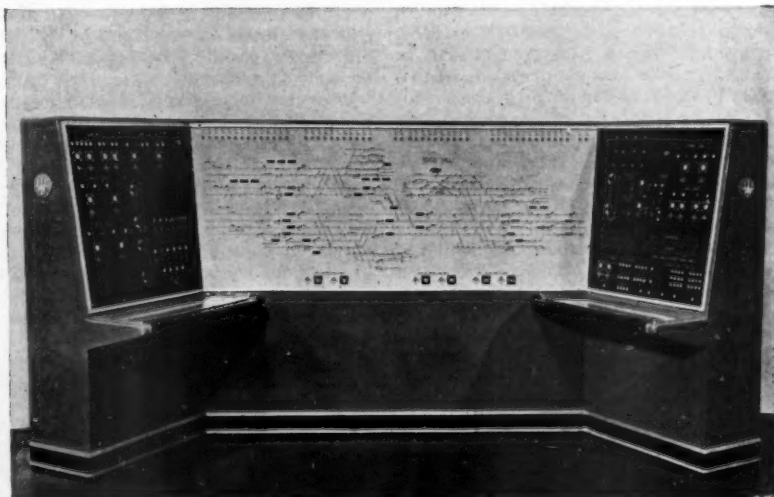
positions and clearance requirements for high-voltage conditions but are entirely separate from traction structures and wiring. They are bonded to location earths and fitted with mesh guards for the protection of staff. Signalbox lever frames, ground frames, and steel line-side apparatus cupboards are bonded to local earth spikes. Signal wire and point rodding is insulated at each end and intermediately as necessary.

### Power Signalboxes

Of the 400 signalboxes on the lines to be electrified approximately one third will be abolished. Fourteen power signalboxes are to be built and a number of others will be renewed as electro-mechanical boxes of the standard type. The original plan provided for many more power signalboxes, but the acceleration of the electrification project has made it necessary to defer some of them. The new signalling will be planned in such a way as to facilitate the extension of power signalling as opportunities arise.

The new power signalboxes are located at Manchester London Road, Wilmslow, Sandbach, Edge Hill, Weaver Junction, Norton Bridge, Nuneaton, Wolverhampton, Birmingham, Coventry, Rugby, Watford and Euston. They replace over 80 existing boxes, the largest concentration being at Manchester London Road where the new power box which is in full operational use controls an area formerly controlled by 13 signalboxes. In the 31-mile section Crewe to Manchester, 27 signalboxes have been replaced by three new power boxes resulting in an all round speeding up of traffic working and much improved regulation.

Two types of control panel are being used in the new power signalboxes. The



*Miniature NX push-button panel including train number displays*





*Typical point layout, showing e.p. point mechanism and detector box*

first type, of which Sandbach is an example, takes the form of a switch console on which two- and three-position switches are mounted with their associated indication lamps. Three-position point switches are also fitted for emergency use. An illuminated track diagram is mounted behind the console.

There is a separate switch on the console for each signalled route and the controls are arranged so that if the route is available at the time the route switch is turned, the points in that route are set to the required positions. Providing the track circuits are clear and the points are fitting correctly the signal will change to a clear aspect without any further action on the part of the signalman. For normal through working on the main lines the relevant signal route switches are set in the automatic position and the signals worked automatically.

If a diversion is necessary at a junction or a train is required to be worked to or from a siding the appropriate route switches are turned to the non-automatic position and full control taken over by the signalman.

The second type of panel is smaller and combines the illuminated track diagram and console in the one unit. Edge Hill is an example of this type. Routes can be set and signalled by the operation of two push buttons mounted in correct geographical relationship on the panel. Two buttons are pressed for each route switch, one at the entrance and one at the leaving end of the section concerned.

A modification of this type is being installed in the operating room of the new Coventry power signalbox in which a station announcer is to be accommodated in addition to the signalman and regulator. The illuminated track diagram in this case is mounted somewhat higher than at Edge Hill and includes all the indications which require to be observed by signalman, regulator and train announcer. The push buttons with which only the signalman is concerned are separate from the diagram and mounted on a desk showing the geographical layout to a small scale.

In the latest power signalling schemes

provision has been made for one signalbox to control a large area. The new power box at Wilmslow for instance controls 15 route miles of line. To provide these facilities economically the area controlled is divided into sections, the signal, point and track-circuit control and interlocking functions in the more remote sections being concentrated in satellite relay interlockings each complete in itself so far as safety signalling and interlocking circuits are concerned.

#### Transistorised Coding Equipment

Two forms of remote control have proved satisfactory under actual working conditions. Transistorised coding equipment of the C.T.C. type, which has been used between Crewe and Manchester for the control of satellite relay interlockings situated more than two miles from the parent box, is of a completely new type, the first of its kind to be introduced on British Railways. With this system, control and indication codes are transmitted between relay interlocking and signalbox at carrier frequencies over one pair of wires at a rate of 150 codes per sec.; by this means each two position function is continuously scanned and any change of condition in the field indicated on the illuminated track diagram or control panel in a fraction of a second.

For relay interlockings situated between one and two miles from the parent signalbox a direct wire method of remote control has been used successfully. Separate twisted pairs in telephone type cable (20-lb. wire) are used for each indication and control function with miniature post office type relays for the line circuits. Other new equipments and remote control techniques are being tried experimentally but have not yet proved themselves in service.

Provision has been made for existing signalboxes used mainly for shunting purposes to be divorced from main line work and reduced in status to shunting frames open only as required or replaced by a ground frame electrically controlled from the nearest signalbox.

All running lines are being equipped with multiple-aspect colour-light signals

of high-beam intensity (mostly four aspects) mounted on specially designed structures to give motormen the best possible approach sight, minimise the "tunnel" effect of the new traction structures and overhead wiring, and conform to the clearance requirements for high-voltage overhead electrification. The lamp used is a tripole lamp with two filaments of equal wattage 12V. 24/24W., the second filament serving as a standby should the main filament fail.

All running lines will be track circuited throughout thereby contributing to greater safety, speed of working, and enabling many of the new colour-light signals to be worked automatically.

#### Design of Track Circuits

Three types of track circuit are being used, each specially designed for 50-cycle a.c. traction conditions. By far the largest number are of the protected d.c. rectifier-fed single-rail type. With this type the rectifier feed unit incorporates a special protective feature designed to prevent rectified a.c. traction return current being fed back to the rails as d.c. The special d.c. track relay used is inherently immune to operation by a.c. current and is capable of withstanding considerable a.c. voltage without impairment of its d.c. characteristics.

As the d.c. track circuit described above is not suitable for lengths over 500 yd. a limited number of longer track circuits of the 75-cycle a.c. double-rail type with impedance bonds have been used. The 75-cycle current is derived from a static 50/75-cycle frequency converter for each track circuit. At the relay end the 75-cycle current from the rails is fed through a frequency discriminator and rectified to a standard d.c. track relay.

In areas where 50-cycle a.c. traction is present with d.c. traction or d.c. leakage from adjacent traction systems, 83½-cycle track circuits giving immunity from both traction systems are used. Such conditions obtain at Manchester London Road and Crewe where a large



*Electro-pneumatic point valve unit with detachable plug connector to facilitate changing*

number of track circuits are concentrated in a comparatively small area, and rotating machinery for frequency conversion is economically justified.

#### Train Description

Manual block working and the belling of trains from box to box is being dispensed with and a new type of train description equipment introduced. This change coincides with the introduction of the train numbering system by which each train is given a four figure number. This number is set up by the signalman at the entering end of the section after which it is stepped forward automatically from signal to signal and box to box by the operation of track circuits as the train proceeds. Provision is also made for interposing train numbers at junctions and other originating points. In power signalboxes the train number is projected on small screens on the illuminated track diagram opposite the berth track circuit of each signal concerned. In this way the signalman is able to see at a glance the description and location of each train within his control area.

At certain level crossings, Banbury Lane, Coton, and Hademore, the gates are being replaced by electrically operated lifting barriers and road signals. Under normal conditions with the barriers across the roadway the rail signals protecting the crossing will work automatically.

#### Power Supplies

The normal power supply for signalling purposes is taken from the local area authorities network at track section cabins spaced at five- to 10-mile intervals and distributed at 650 V. A transportable diesel-driven standby set is installed at each track section cabin, but as soon as the permanent traction supply becomes continuously available this will be used as the permanent standby and the diesel sets will be transferred elsewhere.

Facilities for the automatic change-over from the normal to the standby supply are provided to cover the possibility of an interruption to the normal supply, a drop in voltage of more than 10 per cent, or a frequency variation of more than two per cent.

At large power signalling installations an independent diesel-driven standby set is provided on a permanent basis to cover all eventualities. At four places, Manchester London Road, Liverpool Lime Street, Crewe, and Euston where 83½-cycle supplies are required, frequency conversion equipment is also installed.

#### Telecommunications

The conditions imposed by the high-voltage a.c. overhead traction system make it necessary to recover the existing open-wire pole routes and to install telecommunications cables laid for the most part in ground-level concrete troughing along with the signalling cables.

To minimise the effects of electromagnetic induction from the traction system, specially screened telecommunications cables have been designed having aluminium sheaths and steel armour tapes with protective serving to prevent

corrosion. The cable sheaths and armour tapes are earthed at intervals of 1,000 yd. to a very low-resistance earth, usually provided by driving a number of copper rods deeply into the ground.

With cables of this type, the voltages induced longitudinally in the cable conductors are kept well within the limits recommended by the C.C.I.T.T., normally no more than 60 V. r.m.s. under normal running conditions, and no more than 430 V. r.m.s. under maximum fault conditions over a 15-mile length. Any circuits which extend more than 15 miles parallel to the traction system are fitted with isolating transformers. To permit dialling through the isolating transformers, 50-cycle impulsing has had to be introduced in place of d.c.

#### Cable Work

Over the greater part of the routes to be electrified, two telecommunications cables are installed, one containing paper-insulated audio-quads with tapping points at signal locations and similar lineside functions, and the other containing paper-insulated quads, plastic-insulated carrier quads, and in some cases miniature coaxial tubes for multi-channel carrier-frequency operation.

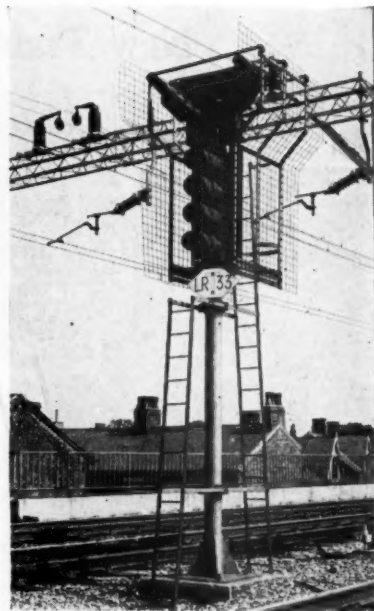
Initially use will be made of 12-circuit carrier-telephone systems working over the carrier quads in these cables to meet the need for increased telecommunications facilities arising from the electrification and re-signalling of the main line, and the additional circuits required to improve the administrative telephone and telegraph networks. As a further stage in the modernisation plan for telecommunications it is proposed to convert all regional telephone exchanges to automatic operation, and to provide long-distance trunk dialling. With the development of this programme the coaxial tubes in the new cables will be brought into use. Each pair of tubes is capable of providing a maximum of 300 circuits.

#### Independent Telephone System

An independent telephone system is being installed for the Chief Mechanical & Electrical Engineer's traction control, and certain pairs in each of the two cables are allocated for traction supervisory purposes. Electrification telephones are installed by the lineside at frequent intervals and are connected to the traction control room. These circuits are of the dial selective type, using 50-cycle impulsing. All main traffic control circuits are being converted to dial selective operation, using 50-cycle impulsing.

Increased use is being made of teleprinters for administrative purposes and for train reporting by v.f. telegraph channelling equipment associated with the carrier-telephone system. As the first step towards the modernisation of the Regional teleprinter network an automatic electronic teleprinter switching system is being installed at Crewe. This equipment is fully transistorised and will use automatic message routing controlled directly from the teleprinter keyboards.

To ensure efficient maintenance of the new equipment and prompt attention to faults maintenance staff are concen-



*Four-aspect colour-light signal with two-position junction indicator, fitted with protective screen*

trated at the new power signalboxes, and intermediately as necessary, and work in three shifts. For mobility a small road motor van is being provided for the use of each group of maintenance staff. A special maintenance telephone circuit is installed throughout each control area to enable the lineman to communicate with the signalman from any point by plugging his handset into a socket on the nearest lineside location. In addition staff location speakers are fitted at intervals along the line in cases where one signalbox controls an extensive area. By this means the signalman is able to call the lineman to the telephone wherever he may be working. The operation of a special key on the telephone keyboard in the signalbox causes a distinctive call signal to be emitted from the speaker units in the area where the lineman is known to be working. Separate keys are fitted for calling the Civil Engineer's and Electrical Engineer's lineside staff each with its own distinctive call.

#### Progress of Work

The resignalling of the lines between Crewe and Manchester has been completed. The new power signalboxes at Wilmslow and Sandbach together with the new signalling controlled from them were commissioned in June, 1959. The new signalbox and signalling at Manchester London Road were brought into use in three main stages in December, 1959, April, 1960 and August, 1960 respectively. The extensive immunisation work in the Crewe station and Heaton Norris areas has also been completed in readiness for the inauguration of the new electric services between Crewe and Manchester on September 12, 1960.

The new colour-light signalling be-  
(Continued on page 310)

## New Trains for Chicago Suburban Service

*Locomotives being converted and double-deck coaches built to operate as push-pull trains*



*One of the new double-deck push-pull trains in service on the Chicago & North Western Railway*

**T**HE Chicago & North Western Railway recently placed orders for 116 additional double-deck railway coaches and the conversion of 45 locomotives which will operate as push-pull trains. Costing \$21,000,000 this new equipment is intended to create a modern, self-supporting transportation system, fully competitive with the motorways and toll roads which provide motorcar access to the centre of Chicago. The new coaches and locomotives will supplement 36 similar coaches ordered in 1959 at a cost of \$6,000,000 and now in operation, and 48 additional double-deck coaches (not of the push-pull type) purchased during the past four years.

All the 116 new coaches are to be built

by the Pullman-Standard Car Manufacturing Company at its South Chicago works, with first deliveries scheduled for next September. The entire order will be completed within the following 11 months at a rate of about 10 a month.

When the deliveries have been completed the Chicago & North Western suburban services, now conveying 80,000 people daily, will be performed with a fleet of 200 coaches with a seating capacity greater than that of the 415 old conventional coaches they will have replaced. The complete modernisation scheme represents an expenditure of \$43,000,000 in a 5½-year period. Finance is being provided by the Metropolitan Life Insurance Company.

Under the push-pull system, which is new for diesel operated trains, the locomotive will always be at the same end of the train, pushing the coaches inbound to Chicago and pulling them on outbound trips. The last coach of such a train is equipped with a control cab at one end of the upper level. The engine crew will always control the train from its front end, and this will be done remotely when the cab is at the far end of the train from the locomotive. The push-pull operation will permit greater flexibility in the use of trains of different lengths and substantially reduces the need for shunting. More off-peak suburban patronage is also expected with the placing into service of the new coaches. During peak rush hours one 10 car double-deck train will have a seating capacity for 1,600 passengers.

### Auxiliary Services

All of the coaches will have air conditioning and fluorescent lighting, while electric heat will replace steam heat. All the electric power will be generated at the locomotive itself and there will be no individual generators under the coaches, resulting in the elimination of noise, dead weight and maintenance. Power and remote control cables will be taken down the entire length of the train by eight cable conduits under the coaches. Each new coach also weighs about 10 tons less than previous models.

In 1959, for the first year as far as is known, the Chicago & North Western Railway Company operated its suburban service at a small nominal profit. This sharp reversal of past performance is credited to the modernisation programme as far as it had been applied to that date. It was this success that stimulated the further modernisation efforts.

### Signal Engineering for Main-line Electrification

*(Concluded from page 309)*

tween Speke Junction and Wavertree Junction on the Crewe-Liverpool Line was brought into operation on August 7, 1960. This work includes a new standard type electro-mechanical signalbox at Allerton Junction. This section was given priority to enable the traction wiring to be energised in advance of the remainder of the Crewe-Liverpool line to permit electric locomotives and multiple-unit trains to be run for training motormen. The new signalling on the remaining section of the Crewe-Liverpool line is programmed in four stages; between Speke Junction and Halton Junction in October, 1960, between Halton Junction and Hartford Junction in February, 1961, between Hartford Junction and Crewe in April, 1961, and between

Wavertree Junction and Liverpool Lime Street in June, 1961. The latter section includes the new power signalbox at Edge Hill incorporating a push-button route-setting miniature panel, the first of its kind to be introduced in the London Midland Region.

Work is also proceeding south of Crewe and the present programme provides for the new signalling to be brought into use between Crewe and Madeley in May, 1961, Madeley to Stafford in July, 1961, Stafford to Milford and Brocton in October, 1961, and Stafford Station with its immediate approaches in March, 1962. The new power signalbox and signalling at Coventry is in progress, and will be brought into use in two main stages, the first at the end of 1961 and the second in the Spring of 1962.

The whole of the work is being carried out under the general direction of Mr. E. G.

Brentnall, Signal Engineer, British Railways, London Midland Region. The three main signalling contractors are Westinghouse Brake & Signal Co. Ltd., Siemens & General Electric Railway Signal Co. Ltd., and Associated Electrical Industries—G.R.S. Limited.

The principal sub-contractors are as follows:—

Signalling and telecommunication cables	British Insulated Cables Ltd.
Train describer equipment and signal post telephones	Standard Telephones & Cables Limited
Power generating plant and switchboards	Pelapone Limited
Construction of main cable routes and installation of signal and location bases	United Kingdom Construction & Engineering Co. Ltd.
	P. Lowery & Sons Ltd.

**ROLLING STOCK FOR AUSTRALIA.**—The Commonwealth Railways is to call for tenders for 28 high-speed passenger bogies, 40 steel flat wagons, and 40 open goods wagons.



## RAILWAY NEWS SECTION

## PERSONAL

Mr. Ratan Lall, Director, Traffic (Transportation), Indian Railway Board, has been appointed General Manager, Northeast Frontier Railway of India.

Miss Elizabeth O. Cullen, Librarian of the Association of American Railroads, retired on August 31 after 43 years with the Association. She has been succeeded by Mr. H. L. Eddy, who joined the A.A.R. in 1940.

Mr. P. H. Sarma, Chief Operating Superintendent, Southern Railway of India, has been appointed Acting General Manager of that railway.

Mr. E. McI. Barnetson, Chief Draughtsman, Western Australian Government Railways, has been appointed Assistant Chief Mechanical Engineer. Mr. Barnetson was trained with the North British Locomotive Co. Ltd., and later worked in the Armstrong-Whitworth locomotive department

she has been engaged in the Works Section. Miss Blackwell was elected a Fellow of the Royal Society of Arts in 1920, and an Associate of the Chartered Institute of Secretaries in 1922. She was awarded the "Prince of Wales" Gold Medal of the London Chamber of Commerce in 1936.

Mr. J. H. Allen, Deputy General Manager of Rhodesia Railways, is visiting the United Kingdom in the course of a tour of inspection of European railway systems.



*Mr. A. Goldstein*

Chief Civil Engineer, South African Railways, who has retired



*Colonel W. H. Evans*

Appointed Chief Civil Engineer, South African Railways

Mr. Alfred Goldstein, B.Sc., A.M.I.C.E., Chief Civil Engineer, South African Railways, who, as recorded in our July 1 issue, has now retired, was educated at St. John's College, Johannesburg, and at the University of Witwatersrand. He joined the South African Railways service as a Junior Assistant Engineer in 1923, and has had experience in practically every part of South Africa. After a period as Acting Resident Engineer at Cape Town, he was promoted to be Resident Engineer, Germiston, and, in 1945, he became System Engineer, Johannesburg. He was appointed Chief Research Engineer (Civil) in 1947, and Inspecting Engineer (Maintenance) in 1948. Three years later he became Assistant Chief Civil Engineer (Maintenance), and in 1956 he was promoted to be Chief Civil Engineer. Mr. Goldstein was on active service from July 14, 1940, to October, 1942. He has served on numerous committees, and has been responsible for many of the investigations into civil engineering problems conducted on behalf of the South African Railways.

at Newcastle, before he joined the Western Australian Government Railways about 26 years ago.

Mr. J. R. Farquharson, General Manager, East African Railways & Harbours, is at present on leave in this country. He returns to East Africa in late October.

Miss C. E. Blackwell, a member of the General Manager's Staff, British Railways, London Midland Region, Euston, who has retired after 44 years' service, was born in Crewe. She was educated at Crewe Grammar School, and joined the former London & North Western Railway in the Rolling Stock Superintendent's Office in March, 1916. In September, 1921, she transferred to the Office of the General Manager, Euston, then Sir Arthur Watson, and subsequently served under his seven successors, Mr. H. G. Burgess, Lord Stamp, Sir William Wood, Mr. G. L. Darbyshire, Mr. John Elliott (now Sir John Elliott), Mr. J. W. Watkins, and Mr. David Blee. From 1948 to 1960

Colonel W. H. Evans, C.B.E., Assistant Chief Civil Engineer, South African Railways, who, as recorded in our July 1 issue, has been appointed Chief Civil Engineer, joined the railway service in 1923, and his first position was on the Belmont construction on the Cape main line. After serving in various parts of the country, he became Inspecting Engineer at Railway Headquarters, Johannesburg. After active service during the 1939-45 war, he was awarded the O.B.E., and subsequently the C.B.E. He was twice mentioned in despatches. Colonel Evans was appointed Assistant Chief Civil Engineer in 1953.

## L. M. REGION APPOINTMENTS

The following appointments have been announced by the London Midland Region: Mr. M. G. E. Lambert, Divisional Traffic Manager, Liverpool Division, to be Line Traffic Manager with Headquarters at Manchester; Mr. J. Royston, Divisional Traffic Manager, Manchester Division, to be Line Traffic Manager with Headquarters at



*Mr. H. C. Steeples*

Appointed Assistant Civil Engineer (Modernisation), North Eastern Region, York



*Mr. A. G. Collings*

Appointed Assistant Superintendent of Laboratories (Chemist), London Transport Executive



*The late Mr. G. L. Drury*

Assistant Electrical Engineer, North Eastern Area, L.N.E.R., 1924-38

Crewe; Mr. R. L. E. Lawrence, Divisional Traffic Manager, London Division, to be Line Traffic Manager with Headquarters at Derby. Further reference is made to changes in London Midland organisation elsewhere in this issue.

Mr. H. C. Steeples, Assistant Engineer (New Works), North Eastern Region, who, as recorded in our September 2 issue, has been appointed Assistant Civil Engineer (Modernisation), N.E. Region, York, was educated at West Bridgford County Secondary School, and joined the former London Midland & Scottish Railway in 1935 in the Divisional Engineer's Office at Derby. He subsequently occupied posts in the St. Pancras, Watford, and Euston Chief Civil Engineers' Offices. In 1951 he transferred to the North Eastern Region and was appointed Assistant Engineer (Bridges) in 1952. In 1956 he was promoted to the position of Assistant Engineer (New Works).

#### B.T.C. APPOINTMENTS

The following appointments have been announced by the British Transport Commission:—

##### Finance Department

Costings Division; Mr. R. Robinson, Assistant Traffic Costing Officer, York, to be Traffic Costing Officer, York.

##### Legal Department

Mr. P. Moore, Solicitor Assistant, to be Senior Solicitor Assistant.

##### Supplies Department

Mr. F. H. Gee, Assistant Fuel Supplies Officer, to be Fuel Supplies Officer.

##### British Railways Research Department

Mr. D. L. Bartlett, Assistant Director, Engineering Division, Derby, to be Assistant Director of Research (Engineering), Derby.

##### British Railways Central Staff

Signal Engineering Department; Mr. B. H. Grose, Deputy to Senior Equipment Engineer, Westinghouse Brake & Signal Co. Ltd., to be Assistant (Development).

##### Scottish Area Board

Mr. C. A. Scott, Personal Assistant to Deputy Chairman, British Transport Commission, to be Secretary, Scottish Area Board.

Mr. A. G. Collings, Principal Scientific Assistant, London Transport Executive, who, as recorded in our August 12 issue, has been appointed an Officer of the Executive with

the title of Assistant Superintendent of Laboratories (Chemist) in the Office of the Director of Research, was born in 1913. He was educated at the Stationers' Company's School and at Birkbeck College, London. His early experience was gained in the Laboratory of the Government Chemist. He joined the London Passenger Transport Board in 1935 as an Assistant Chemist, and became a Senior Executive Assistant in 1950. He was promoted to be Principal Scientific Assistant in 1955.

Mr. W. V. S. Sinclair has resumed the Chairmanship of A. B. C. Coupler & Engineering Co. Ltd.

Mr. D. G. Denoon has been appointed Public Relations Manager of the British Insulated Callender's Cables Group.

Mr. G. H. Yarnold has been appointed Manager of the Parts Merchandising Branch of Perkins Engines Limited.

Mr. H. Roy Thielé has been appointed Deputy to the Advertising Manager of The Morgan Crucible Co. Ltd.

Mr. Frank Carr, of the Dunlop Rubber Company, has retired. He was responsible for Dunlop's accessories sales from 1928.

Mr. A. Liston has been appointed Commercial Vehicle Representative, Edinburgh Depot, Dunlop Rubber Co. Ltd.

Mr. H. B. McAuslan, has been appointed Assistant General Sales Manager of W. H. Dorman & Co., Ltd.

The late Mr. G. L. Drury, formerly Assistant Electrical Engineer N.E. Area, former L.N.E.R., whose death was recorded in our September 2 issue, was born and educated in Dublin. He joined the Dublin United Tramways Company in 1898, at the time of the conversion of the system for electrical working. In 1904 he joined the former North Eastern Railway at York, and was in charge of the electrical equipment of the rolling stock for the Tynemouth branch. Later that year he was appointed Car Shed Superintendent, N.E.R., at Walker Gate, Newcastle-on-Tyne, in charge of the electric rolling stock and motormen. Under the late Sir Vincent Raven, Mr. Drury was

responsible for the electrical equipment and putting into service of the 1,500-V. electric locomotives on the Shildon-Newport line. He also represented the N.E.R. on several British Electrical Standards Association committees, including that on traction motors. During the 1914-18 war he was seconded to the Admiralty for special work. In 1919 he was promoted to be Carriage & Wagon Works Manager at Walker Gate for the Northern Division of the N.E.R., and in 1924, after the railway amalgamation he was appointed Assistant Electrical Engineer, N.E. Area, L.N.E.R., with headquarters at Darlington, and was in charge of traction, power and lighting in the N.E. area. Mr. Drury was a Member of the Institution of Electrical Engineers, and an Associated Member of the Institution of Mechanical Engineers.

Mr. B. F. Akerman has been appointed General Manager of Charles Carr Limited.

Mr. P. R. McGehee has resigned from the board of the Aluminium Corporation Limited.

Mr. F. S. Barton has been appointed to the board of Mullard Equipment Limited.

Mr. G. R. Francis has been appointed Traction Engineer to British United Traction Limited.

Mr. P. M. J. Boulasse, Mr. S. C. Burgess, Mr. G. Durward and Mr. L. G. Stock have been elected Directors of Richard Thomas & Baldwins (Sales) Limited.

Mr. Peter Broomer has been appointed Product Manager, Programme Systems & Special Products, Aircraft-Marine Products (Great Britain) Limited.

Commander E. G. Sutton, R.N. (Rtd.), a former Chairman of the Admiralty Remote Power Control Panel has been appointed to the position of Works Director of Sir W. H. Bailey & Co. Ltd., Albion Works, Manchester.

Mr. A. W. Thwaites has been appointed Commercial Director of Richard Hill Limited, a member of the Firth Cleveland group. Mr. H. M. Macgregor has been appointed Works Director.

## NEW EQUIPMENT AND PROCESSES



### Tool Grinder

**T**HE Scherrer HSM20-80 grinder has been designed for rapid grinding of clearance angles on lathe and planer tools of up to 2½ in. square section or 4 in. x 3 in. with an additional support.

When grinding both carbide tip and shank material simultaneously, up to 0.135 cu. in. per min. can be removed, and up to 3.05 cu. in. per min. on high-speed steel. It is claimed that a fine finish is produced with no cracking of the material. The correct grinding angle can be set readily by means of dials.

Six large abrasive segments are mounted on the face of an 11½ in. dia. cylinder, independently motorised; these rotate at a surface speed of 40 ft. per sec. Electrical braking is provided. The table reciprocates at 60 cycles per min. and infeeds of 0.0002 in. to 0.0028 in. are obtainable.

Further details may be obtained from the sole distributor for the United Kingdom, Dowding & Doll Limited, 346, Kensington High Street, London, W.14.

### Lamp Price Reductions

**R**EDUCTIONS varying between 7 and 19 per cent have been made by the A.E.I. Lamp & Lighting Co. Ltd. in the prices of its daylight, warm-white, and white 3,500°K fluorescent lamps, and a number of its colour-matching, natural, and warm-white de-luxe fluorescent lamps.

Mazda reflector fluorescent lamps are similarly reduced in price except for 12-in. 6W. lamp which is increased by 6d. to 8s. 6d.

### Horizontal Boring Machine

**T**HE Lazatti HB 80P horizontal boring machine, with 3½-in. spindle and 19½-in. dia. facing head, has a special supplementary guide incorporated in the saddle.

The range of speeds available and the motor power (7½ h.p.) permit the most effective use of carbide-tipped tools. Controls are provided for both fine feed and rapid traverse. The machine is provided with precision verniers in English or metric, and limit switches on all slides. All parts are automatically lubricated. A built-in pump supplies lubrication to the headstock and a sight glass permits control of the level.

The base has a large plain V-guide and is well ribbed to prevent vibration. The internal mechanism of the drive is incorporated in the spindle box of the headstock. Maximum facing diameter is 27½ in. and the maximum distance between centre line of spindle and table is 39½ in.

Further details may be obtained from the distributor for Britain, Thos. W. Ward Limited, Albion Works, Sheffield.

### Diesel Testing Equipment

**D**EVELOPMENTS in the construction of the equipment for testing diesel fuel-injection pumps and injectors, known respectively as the Diestester Mark II and Injectester Mark II, have been made recently. The developments have been along the lines of lighter weight, greater compactness, and more convenient application (see next column).

Weight of the Mark II Injectester is 5 lb. contrasted with the 11 lb. of the Mark I, and the Mark II is supplied with a single set of pipes assembled ready for immediate application. A complete test on a four-ram pump now occupies only 15 min. Its use also enables fuel injectors to be checked in place and balanced to the injection pump with the engine running.

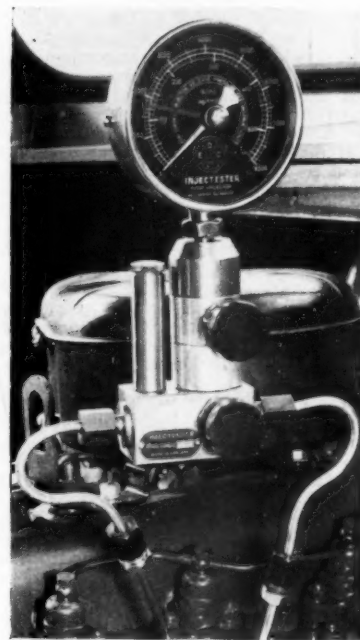
Further details can be obtained from the Dunedin Engineering Co. Ltd., 73/75, Mortimer Street, London, W.1.

### Mist Lubrication

**R**OLLER bearings with oil-mist lubrication are claimed to offer increased resistance to wear and reduced oil consumption compared with those relying on conventional circulating-oil or grease.

Timken roll-neck bearings are now available with this system which has been developed by specialist manufacturers using Timken design and field engineering service. Small particles of oil are formed and blown into the bearing through tubing to form a continuous film.

Further details may be obtained from British Timken, Division of the Timken Roller Bearing Company, Duston.

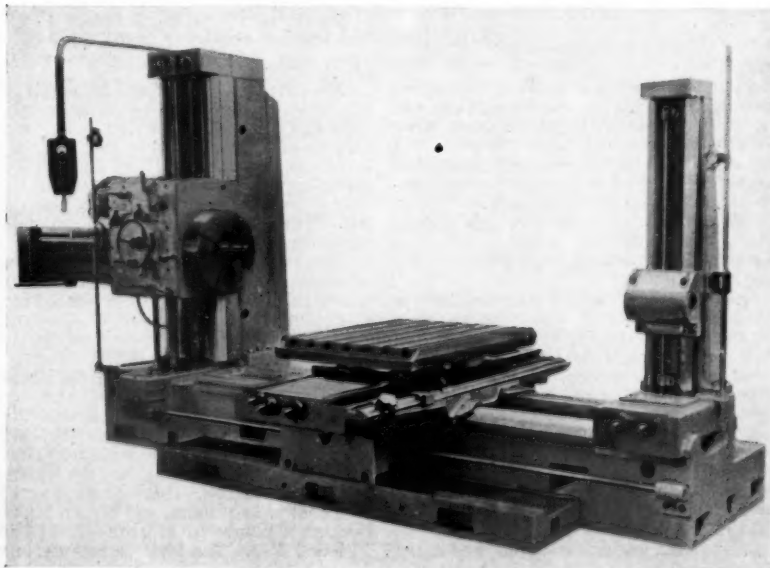


### Reinforcement for Glass-Fibre

**T**HE range of products by Turner Bros. Asbestos Co. Ltd. for glass-fibre moulding has been extended by the addition of an emulsion-bound "A" glass mat for use in making parts by the process of contact moulding.

An "E" glass emulsion Duramat also is to be introduced which, it is claimed, will make the range one of the most comprehensive available. The specially formulated powder-bound Duramat in Alkali and "E" glass for compression moulding will continue to be available.

Further details may be obtained from the manufacturer, Turner Bros. Asbestos Co. Ltd., Rochdale, Lancs.





## Ministry of Transport Accident Report

*Slade Lane Junction, Levenshulme, Manchester, November 23, 1959: British Railways, London Midland Region*

Colonel D. McMullen, Inspecting Officer of Railways, Ministry of Transport, inquired into the collision which occurred at Slade Lane Junction, British Railways, London Midland Region on November 23, 1959, at 4.51 p.m. The 9.45 a.m. Bournemouth to Manchester down express passenger train (the "Pines Express") and the 3.59 p.m. down local diesel passenger train from Buxton to Manchester were approaching Slade Lane Junction more or less simultaneously on the down fast and down slow lines respectively. The diesel train was to be stopped at the home signal protecting the converging junction between these lines to permit the express to be crossed to the slow line and to precede it over that line to Manchester.

### Signal Over-run

The diesel failed to stop at this signal, which was showing a red aspect, and the two trains came into side-long collision at a point about 280 yd. beyond it. They ran in contact with each other for some 100 yd. and then stopped with the engine and tender and the three leading coaches of the express and also the three leading and the rearmost

time of the accident darkness was falling.

Slade Lane Junction is  $3\frac{1}{2}$  miles from Stockport and  $2\frac{1}{2}$  miles from Manchester. It is the point where the four-track line from Stockport (on which both trains were travelling) joins the loop line from Wilmslow *via* Styal. Heaton Norris ( $2\frac{1}{2}$  miles distant) is the next box towards Stockport. At the time of the accident the next box towards Manchester was Longsight No. 1 ( $\frac{1}{2}$  mile distant), but this has now been closed. Slade Lane Junction box has also been closed since the accident. The working from Slade Lane Junction onwards being now concentrated in the new Manchester London Road Signalbox.

Levenshulme is the station next in rear towards Stockport. It is about  $\frac{1}{2}$  mile from Slade Lane Junction. Its platforms serve only the slow lines.

At Slade Lane Junction the down fast and up slow lines are transposed. This, and the relevant signals and connections between fast and slow, are shown in the diagram. As stated, the Pines Express was being crossed from down fast to down slow. The speed limit through these cross-overs is 40 m.p.h.

ber relates to the left-hand route, whether through or crossover.

When a route is set up by turning a signal switch, all the relevant points are correctly set up, locked and detected, and a row of white "route" lights becomes illuminated on the diagram along the route. The signal concerned is then free to clear, and on clearing its repeater next to the switch changes from red to green (green covers all "off" aspects).

### Approach Locking

Once a route is set up, the signal becomes "approach locked" when the train occupies certain track circuits in rear. The route remains locked until either the train occupies the track circuit next beyond the signal or until a time element relay has operated. For movements controlled by 25/1 the approach locking track circuits are Nos. 6 and 7, but with signal 21 at double yellow and 17 at green, the approach locking extends back to (and including) track circuit No. 1. The time relay releases the locking after three minutes. For signals 25/2 and 26/1, the approach locking track circuits are Nos. 7 and 14, and the time relay operates after two minutes.

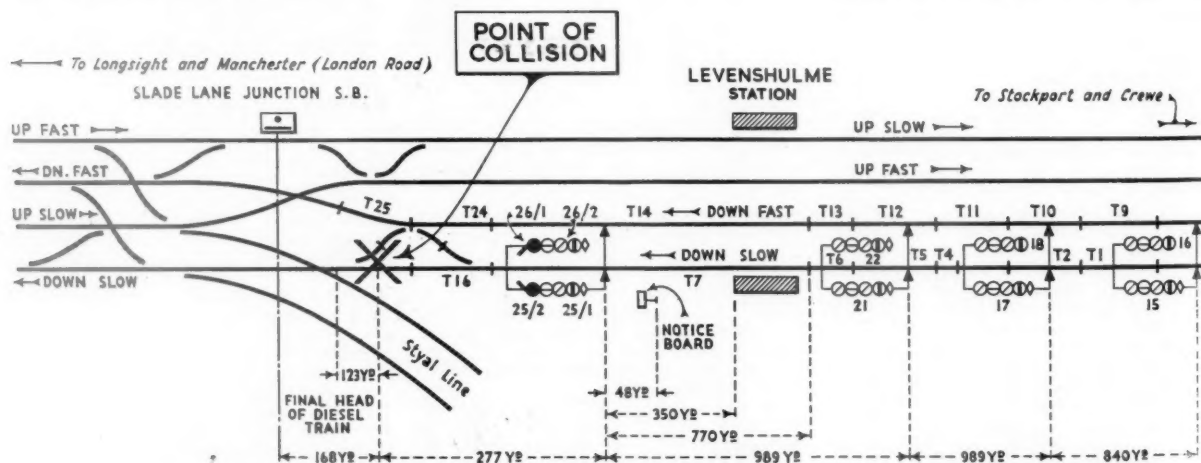


Diagram showing circumstances of accident at Slade Lane Junction, British Railways, London Midland Region, November 23, 1959. Individual track circuits shown only up to the point of collision

coach of the diesel train derailed. Both trains were lightly loaded and three passengers and one railwayman were slightly injured. They were taken to hospital, but not detained. An ambulance and the fire service were called at 5 p.m. and arrived at 5.10 p.m. They rendered valuable service to passengers.

The down fast and slow lines were blocked with extensive damage to signalling equipment and disturbance of track-circuits in the area.

Lifting of the derailed vehicles by the breakdown steam cranes was delayed while the overhead traction wires, erected but not then energised, were slewed to allow the jibs to be raised. All coaches were re-railed and removed by 11.30 a.m. the following day, but the damage to signalling equipment meant that normal working was not re-introduced until 6.10 a.m. on November 25, and then there was a 20 m.p.h. restriction of the down fast and slow lines. Special bus services were introduced as required as a substitute for cancelled trains.

The weather was fine and clear, and at the

Down home signals 25 and 26, which protect these crossings, are colour-light signals with junction indicators (the latter, when illuminated, are sometimes referred to by drivers as "feathers"). They are now four-aspect signals, but at the time of the accident only three aspects were in use, as Longsight No. 1 was still equipped with semaphore signals and signals 25 and 26 were acting as distants to them. On the down slow signals 15 onwards were controlled by Slade Lane, but on the down fast 16 and 18 worked automatically.

### Route Relay Control

At the time of the accident all train movements at Slade Lane were controlled by a route relay control system of the "one control switch" type in the signalbox. With this system each signal is operated by one or more switches according to the number of routes it controls. Thus signals 25 and 26 each control two routes, and so each has two switches numbered 25/1 and 25/2; and 26/1 and 26/2. The lower subsidiary num-

These are the "berth" track circuits for signals 25 and 26, and they "approach control" these signals for crossover movements. That is, although the switch for one of these signals may have been turned and the route properly set up, the signal will not clear until the berth track circuit has been occupied.

"Running away" bells are provided, which operate when the track circuit ahead of a signal becomes occupied with the signal at danger. An indicating light shows which signal has been passed at danger.

There is no block working between Slade Lane and Heaton Norris. At the time of the accident, trains were "belled" only. Ordinary block working, with three-position instruments, was then in force between Slade Lane and Longsight No. 1. Signals 25 and 26 required "line clear" from Longsight No. 1—a separate release for each train.

The "Pines Express" consisted of seven bogie coaches drawn by a Class 6P 4-6-0 tender engine, driven from the left-hand

side. The diesel train was made up of two three-car sets. The driving position was on the left-hand side of the driving cab.

#### Signalmen's Evidence

The express, which was running about 4 min. late, was belied by Heaton Norris to Slade Lane at 4.47 p.m.; and the diesel train at 4.43 p.m. The Slade Lane Junction signalman in charge decided to keep to the booked working, which was to cross the "Pines Express" from down fast to down slow and to run it on the down slow ahead of the diesel train, which he would hold at its home signal, No. 25. He therefore instructed a trainee signalman accordingly, and the latter first obtained "line clear" from Long-sight No. 1 and then turned switch 26/1 to set up the down fast to slow route. At that time the signalman in charge saw that the express was on track circuit 13 and the diesel on track 7. He also saw the repeater of signal 26 become clear, when the express struck track circuit 14 a few sec. later. At the same time he saw that the repeater 25 was red. Soon after he heard the "running away" bell, and he looked at the diagram and saw that the diesel had passed signal 25. He then looked out of the window and saw the express, but could not see the diesel which was behind it. The latter, however, must have been travelling faster than the express, because the signalman thought that it was a coach length ahead when the collision occurred. The express was definitely slowing down, and the signalman estimated its speed at 10 m.p.h. at the time of impact.

The trainee signalman was quite certain that he had not turned switch 25/1 or 25/2 by mistake and then put it to normal and turned 26/1. The signalman in charge confirmed this, and said that if such a mistake had been made, the approach locking on signal 25 would have prevented signal 26 from being cleared. He was completely satisfied that the equipment was working satisfactorily and said that there had been no danger-side failures since the preceding January when he went to Slade Lane box.

#### Express Driver's Evidence

The driver of the "Pines Express" said that after he left Stockport the signals were green the whole way until he saw No. 18 at double-yellow and then No. 22 at yellow. No. 26 was red but changed to green with the left-hand "feather" as he was passing through Levenshulme. He had closed the regulator when he saw signal No. 18, and did not open it again. When passing Levenshulme he saw the tail lights of the diesel train at, he estimated, not less than six coach lengths (about 120 yd.) ahead, and thought it was stationary. He thought the speed of his train was 25-30 m.p.h. when he passed signal No. 26, and it was then that he realised that the diesel train, which he had overtaken to the extent of three or four coaches, was moving and must have passed the slow line signal at danger. He at once made a full brake application. He felt the brakes "take hold" and reduce his speed, but they could not stop the train before the collision. After the impact he got the impression that the diesel was "carrying the express along." He said that he could not see the slow line signal.

The fireman of the express corroborated the driver's evidence except that being on the right-hand side of the engine he had not seen the diesel train and did not know why the driver had applied the brakes. The guard could give no useful information. He had not looked out for the Slade Lane signals and, after leaving Stockport, had not seen the diesel train.

The driver of the diesel train said that after Heaton Norris the signals were green until he saw No. 17 at double-yellow and No. 21

at yellow. He stopped his train at Levenshulme as booked, and from there saw that both signals 25 and 26 were red. On receiving the "right-away" signal  $\frac{1}{2}$  min. later he started the train, and accelerated up to about 24 m.p.h., but signal No. 25 was still at red, and so he shut off the power. He said that when he was quite close to the signal, he saw it change from red to yellow with a right-hand "feather," so he again applied the power and proceeded to pass it. The next thing he knew was that there was a "bump." He had not seen the Pines Express after leaving Stockport.

He was not certain how far he was from the signal when he thought he saw its aspect change. At first he said the distance was 15-20 yd.; then that he did not think the train had passed a notice board 48 yd. from the signal. He thought that by then the speed of the train had dropped to about 20 m.p.h. He was sure that when the signal changed from red to yellow, there was a "feather" to the right, which indicated that the train was to be crossed to the down fast. This did not surprise him, as sometimes the train was crossed in this way. He did not, however, realise that the train had not taken the cross-over road to the right which starts 120 yds. beyond the signal. He had driven the same train on many occasions; he could not remember having been previously stopped at signal No. 25 to allow the express to go ahead, but he agreed that he had frequently been checked there on that account.

He was questioned closely about signal No. 25 but was emphatic that he thought he saw its aspect change from red to yellow with a "feather." He said he did not at that time notice the fast line signal. He was alone in the driving cab and the blinds behind him were pulled. There were no extraneous lights to distract him. He drove only diesel trains, which he preferred to steam, because, he said, "they are good to work and you get a better view." The window by his side was half open, and one of the two heaters on. He agreed that the new colour-light signals were "pretty good."

The guard of the diesel train saw signal No. 25 at red from Levenshulme Station. He said that after the train had re-started it went slowly for some time and then started to accelerate and he assumed that the signal had cleared; he did not, however, observe the signal, though he agreed that he should have done so. He said that at one time the express was overtaking the diesel train but then the latter started to overtake the express.

The District Signalmen's Inspector arrived at Slade Lane box 25 min. after the accident. He found switch 26/1 reversed, and switches 26/2, 25/1 and 25/2 normal. The repeaters of both signals were red. Some time later he said that the driver of the diesel train told him that he had a single yellow approaching Levenshulme; while in Levenshulme Station there were two reds in front of him; and when he was half-way from the station to No. 25 signal he thought he got a single yellow aspect with a right hand "feather."

#### Tests on Signalling Equipment

Evidence was given that tests applied to the signal circuits, approach locking, approach controls and block releases at Slade Lane box the day after the accident showed that everything was in order. Nor had any complaints been received about the signalling prior to the accident.

Colonel McMullen states that he is satisfied that the signalling equipment was in proper working order and that the accident was due to the driver of the diesel train passing signal No. 25 at red. This driver must therefore bear full responsibility for the accident. The driver of the "Pines Express" applied his brakes as soon as he realised what was

happening, but his train was then, Colonel McMullen thinks, travelling at about 35 m.p.h., which was within the authorised speed, and the driver could not have avoided the collision.

Signal No. 25 could not have been clear with the route set for the express to cross from down fast to down slow. If the signalman had by mistake first turned switch 25/1 or 25/2, and if the signal had cleared when the diesel train was on track-circuit No. 7, the approach locking would have prevented the signalman from setting up the route for the express.

#### Diesel Train Driver's Error

It seems evident, Colonel McMullen states, that the driver of the diesel train saw signal No. 26 clear for the express and that he took it to apply to his own train. So far as could be ascertained, it seems likely that signal No. 26 cleared when the diesel train had travelled only about 100 yd. from Levenshulme Station, after which both signals Nos. 25 and 26 would have remained in the diesel driver's view, and more or less directly ahead, for about 25 sec. It is therefore extremely difficult to understand how he could have failed to see the bright red light of the slow line signal No. 25, and why he thought that he saw that signal at yellow with a right-hand direction indicator, when in fact it was red and signal No. 26 was green with a left hand indicator. A medical examination showed that he was quite fit with normal eyesight and colour vision.

As Brigadier C. A. Langley, Chief Inspecting Officer of Railways, mentioned in his 1958 Annual Report, the British Transport Commission is undertaking a special investigation into human failures of this nature, with the co-operation of the trade unions and with the assistance of the Medical Research Council. The facts of this case have been made known to the latter.

Neither the guard of the express nor the guard of the diesel train complied with Rule 148 which requires them to keep a good look-out when approaching important junctions.

**SMALL & PARKES EXHIBITS AT EARLS COURT.**—Exhibits by Small & Parkes Limited, which will be displayed at the Commercial Motor Show at Earls Court, London, on September 23, 1960, will include a full range of brake linings and clutch facings suitable for all types of commercial and public service vehicles, friction materials, fan and dynamo belts, radiator hose, and brake meters. Further details may be obtained from Small & Parkes Limited, Hendham Vale Works, Manchester, 9.

**BRITISH STANDARD FOR PHENOLIC-RESIN BONDED ASBESTOS-PAPER SHEETS FOR ELECTRICAL INSULATION.**—The new British Standard publication, B.S.3253, 1960, is a further addition to the range of standards dealing with synthetic resin-bonded paper sheets and tubes, (B.S. 1137, 1314, 1885, 1951 and 2076). The new publication deals with sheets for use for insulation with direct current, or with alternating current at frequencies not exceeding 100 c/s. The laminated sheets are made from asbestos paper bonded with phenolic resin, and the range of thicknesses dealt with extends from 1/64 in. up to and including 1 in. In addition to specifying electrical tests, the standard includes tests to determine mechanical performance of the sheets, such as tensile and shear strengths, impact strength and machining properties. Details of the test methods are given in appendices. Copies, price 6s., may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1.



Bridge from the west side, showing one of the 110-ton outer girders in the foreground and the 170-ton centre girder behind

### New Metropolitan Line Bridge, L.T.E.

Work on the London Transport bridge to carry additional tracks over a widened Rickmansworth Road between Northwood and Northwood Hills Stations on the Metropolitan Line, is now well in hand. The concrete abutments for the section which will carry the new tracks for the fast trains have been completed and the steel lattice girders are being erected. The three girders of the complete bridge are each 163 ft. in length, that in the centre weighing 170 tons and the two outer girders 110 tons each. The bridge was designed and fabricated before the war by engineers of the London Transport Executive.

#### Construction in Two Stages

When the first span has been completed, towards the end of the year, trains will be diverted over it and the second half of the bridge, to carry the local tracks, will be built alongside. The present narrow brick arch bridge, which is in effect a short tunnel through the railway embankment, will be demolished, enabling the roadway to be widened to modern standards. The bridge is built on the considerable skew of 26°, and the clear width beneath the finished bridge available for the roadway and footpath will be 60 ft. The roadwork itself will be carried out under the auspices of the Middlesex County Council. The bridgework is being carried out by the Fairfield Shipbuilding & Engineering Co. Ltd.

### Luncheon to Western Region Mayors

Members of the staff of the Western Region, British Railways, who have been elected to civic office, were entertained to luncheon by Mr. J. R. Hammond, General Manager of the Region, at the Great Western Royal Hotel, Paddington, on August 31, as recorded in our September 2 issue. After luncheon the Sheriff of Exeter, Councillor W. A. Cox, presented Mr. Hammond with a

copy of the book "The History of Exeter Guildhall and the Life Within."

The illustration shows (left to right):  
Back row: Messrs. A. C. Parker, Assistant Regional Establishment & Staff Officer; H. E. R. Bastin, District Traffic Superintendent, Bristol; G. A. V. Phillips, Divisional Traffic Manager, Paddington; R. L. Charlesworth, Commercial Officer; H. G. Bowles, Assistant General Manager; Alderman E. J. Powell, Sheriff of Carmarthen; Messrs. R. A. Smeddle, Chief Mechanical & Electrical Engineer; C. W. Powell, Operating Officer; C. J. Rider, Public Relations & Publicity Officer; H. E. A. White, Running & Maintenance Officer.

Front row: Alderman S. W. E. Salter, Mayor of Liskeard; Councillor A. J. Evans, Mayor of Llanelli; Councillor R. J. Pengelly, Mayor of Fowey; Councillor D. J. Boon, Mayor of Barry; Mr. J. R. Hammond; Alderman A. H. Kinchin, Mayor of Oxford; Alderman J. John, Chairman, Cardiganshire County Council; Alderman J. E. Jones, Mayor of Pwllheli; Councillor W. A. Cox, Sheriff of Exeter.

Councillor F. J. Smith, Chairman of Glamorganshire County Council, was unable to be present.



Mr. J. R. Hammond with officers of the Western Region and members of the staff elected to civic office

### Staff and Labour Matters

#### Railway Shopmen's Pay Claim

The Chairman of the British Transport Commission, Sir Brian Robertson, accompanied by other representatives of the Commission met representatives of the employees' side of the Railway Shopmen's National Council again on September 2 to continue discussions on rates of pay of railway workshop staff. The parties enlarged on the points of view which they had previously expressed and clarified the issues. It was agreed to adjourn the meeting to September 13.

The Commission has offered increases ranging from 5s. a week for unskilled men to 6s. for skilled men and an improvement in the London allowance with effect from July 4, 1960, which is in addition to the increases already granted from January 11, 1960.

The unions consider that the increases should be back-dated to January 4, 1960, the date agreed for railway salaried and conciliation staff covered by the Guillebaud Report. A Doncaster branch of the N.U.R. is reported to have threatened strike action if no agreement is reached.

#### L.T.E. Maintenance Workers' Strike

The staff responsible for the maintenance of lifts and escalators at London Transport Underground stations, who had been on unofficial strike since August 26, returned to work on September 6. The men had withdrawn their labour as a protest against the use by L.T.E. of technical staff to keep the Underground pumps running at a time when the pump workers were on unofficial strike, but had no other ground of dispute with the management.

The 46 pump men, who had withdrawn their labour on August 15 in protest against the handling by their union representatives of a wage claim, returned to work during the evening of September 5. N.U.R. are reported to be investigating the type of work carried out by these men.

### London Midland Region Traffic Department Re-organisation

The London Midland Region, British Railways, has announced details of the second stage of its de-centralisation of the traffic department, covering commercial, operating, and motive power activities.

The six Divisional Traffic Managers will



report to three Line Traffic Managers instead of, as at present, to Regional Headquarters in London. The Line Traffic Managers themselves will be solely responsible to the General Manager, Mr. David Blee. The Line Traffic Managers will have their headquarters in Crewe, Derby, and Manchester.

### Three Line Traffic Managers

The Line Traffic Manager at Crewe will be responsible for (roughly) the former London & North Western Railway in the southern part of Cheshire and Staffordshire and southwards to London. The area of the London Divisional Traffic Manager is to be divided into two. The Divisional Traffic Managers of the new (western portion) London Area, and at Birmingham (London Midland Region) will report to the Line Traffic Manager at Crewe.

The Line Traffic Manager at Derby will be responsible for the area served by that part of the Midland Railway (excluding the Settle to Carlisle line), which is now in the London Midland Region. The Divisional Traffic Managers at Nottingham and of the (eastern) London Area will report to him.

The Line Traffic Manager at Manchester will be responsible for the former L.N.W.R. lines in the northern part of Cheshire and Staffordshire, North Wales, Lancashire and north to Carlisle, the former L.Y.R. lines in Lancashire, and the former M.R. main line from Settle to Carlisle, with branches, that is to say, for the areas of the Divisional Traffic Managers at Liverpool, Manchester, and Barrow-in-Furness, who will report to him.

As recorded in our personal columns, Messrs. J. Royston, R. L. E. Lawrence, and M. G. E. Lambert have been appointed Line Traffic Managers respectively at Crewe, Derby, and Manchester.

**HEAD WRIGHTSON ORDER.**—Head Wrightson Iron & Steel Works Engineering Limited, a subsidiary of Head Wrightson & Co. Ltd., has received a £1,500,000 order from Appleby-Frodingham Steel Company for the design and construction of further extensions to its ore preparation and sinter plants.

**COLLISION ON SITE OF PREVIOUS CASTLEARY ACCIDENT.**—Seventy people were injured, only one seriously, on September 2 when two trains collided on the bridge at Castleary, Scottish Region. A diesel train from Glasgow to Edinburgh collided with an empty train of carriages. Both were travelling in the same direction. After the accident passengers were led along the line to Castleary Station about 200 yd. away, to await the arrival of doctors and ambulances. The leading coach of the empty steam train, which was travelling tender first, was telescoped with the front of the engine. The driver's window of the diesel train was smashed and the second and third coaches parted company. In the collision on the same site on December 10, 1937, 35 passengers were killed.

**DECREASE IN DANISH STATE RAILWAYS TRAFFIC.**—During the year ended March 31, 1960, there was an apparent decrease of about 0.4 per cent in the number of passengers carried by the Danish State Railways. This was due to the fact that in 1959 the Easter holiday, with its considerable passenger traffic, fell in April in 1960. In the Copenhagen suburban area 71.7 million passengers were carried compared with 70.9 million in the preceding year. The increase was mainly in season and weekly ticket journeys. The number of tickets sold to and from stations in foreign countries for the first time showed a decrease, from 3.8 to 3.3 million; the decrease was in travel to and from Sweden.

## Contracts and Tenders

Dowson & Dobson Limited of Johannesburg has received an order for steam locomotive boilers to the value of £53,396.

The Export Services Branch, Board of Trade, has received calls for tenders as follow:—

### From South Africa:

1 four-wheel petrol- or diesel-engine industrial type fork lift truck with a lifting capacity of at least 10,000 lb. at 24 in. load centre

1 fork side shift attachment, hydraulically operated and providing for 4 in. to 6 in. side shift in either direction.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes endorsed "Tender No. F8418, Fork Lift Truck," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. Local representation is essential. The closing date is September 30, 1960. The Board of Trade reference is ESB/22827/60.

1 electric motor-driven heavy-duty single-pulley all-g geared headstock centre lathe.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. G.8357, Centre Lathe, Koedoespoort," should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. Local representation is essential. The closing date is September 30, 1960. The Board of Trade reference is ESB/22825/60.

31 petrol engine driven rail drilling machines for drilling holes up to 1½ in. dia. in manganese steel flat bottom rails varying from 60 to 100 lb. per yd.

Drills of various diameter for use with the above machines.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes, endorsed "Tender No. F.8400: Rail Drills" should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. Local representation is essential. The closing date is September 30, 1960. The Board of Trade reference is ESB/22823/60.

### From Pakistan:

7,999 tons of 75-lb. rail in standard rolled lengths to Pakistan Railway specification T12-49

75,000 fishplates for the above rails according to Pakistan Railway specification T1-49

120,000 fish bolts and nuts to Pakistan Railway specification T3-53

225,000 bearing plates to Pakistan Railway specification T3-49

500,000 dog spikes to Pakistan Railway specification T2-49

The issuing authority and address to which bids should be sent is the Stores Purchase Officer, Mangla Dam Project, Munshi Chamber, Lake Road, Lahore. The tender No. is E.84/MDP/60. The closing date is September 17, 1960. Tenders are to be accompanied with a bank guarantee of Rs. 5,000 as earnest money. The Board of Trade reference is ESB/23415/60. No further information available at the Board of Trade.

### From Iraq:

400,000 wooden sleepers, 2.6 m. x 26 cm. x 15 cm. for standard gauge line as per specifications.

The issuing authority is the Directorate-General, Iraqi Republican Railways, Baghdad West, to whom bids should be sent. The tender No. is IRRS/C/2/60. The closing date is October 9, 1960. The Board of Trade reference is ESB/22897/60.

## New Goods Facilities in L.M. Region

(See last week's issue)



General view of received traffic deck at Clegg Street Depot, Oldham, London Midland Region, British Railways

## Notes and News

**Wolverhampton Works to Stay Open.**—The locomotive repair works at Stafford Road, Wolverhampton, employing 600 men, are to be used for the repair and maintenance of diesel locomotives. It was announced in January that the works were due to be closed between 1961 and 1963.

**L.T.E. Ticket Machine Failure.**—Delays were caused at Victoria Station on the L.T.E. District Line, booking office during the morning peak period on September 1, when an earthing fault affected the electrical mechanism of 17 automatic ticket machines.

**Southampton as British Port for C.P.R. Ships.**—It is reported that the Canadian Pacific Steamship Company may give serious consideration to a suggestion that they should operate its ships from a port other than Liverpool if the unofficial strike of seamen there continues. Before the 1939-45 war the C.P.R. operated its Empress steamships from Southampton.

**Serious Derailment in Spain.**—Eighty-five people are reported to have been injured when two coaches of a passenger train of the Spanish National Railways from Madrid to Badajoz fell into a ravine on September 5 between Belalcázar and Las Cabras Stations, 116 miles from Badajoz.

**New Facility for London Bus Advertisers.**—British Transport Advertising recently installed at Transad House, Leicester Square Station, the top of a London bus front, complete and to full scale to enable advertising agents to test their clients' double front posters for colour and design before they are printed ready for exhibition. This new facility follows the increased demand for double front positions on London buses reported earlier this year. Invitations to sample this service are now being sent to agents in the London area.

**Wagon Repairs Limited Improvements.**—In a recent report, the directors of Wagon Repairs state that the improvement in group profits is attributable to the continued growth of their subsidiary company, Handy Angle Limited. The company's activities in repairing and overhauling privately owned rail vehicles and rail tank wagons used in oil, petrol and chemicals traffic are being well maintained, and its manufacturing departments and foundries are also yielding satisfactory surpluses. It is anticipated that the recent acquisition of Steel Services Limited will prove useful and profitable. The group net profit for 1959-60 was £459,581 (£385,462). The year's distribution is 30 per cent (20 per cent), less tax, and a capital distribution of 9d. per 5s. unit is proposed.

**New Ship for Channel Islands Service.**—A twin-screw turbine steamer, the *Sarnia*, was launched on September 6 at the Cowes yard of J. Samuel White & Co. Ltd., and on delivery next spring is to go in to the British Railways service to the Channel Islands. It is almost identical with the *Caesarea*, now approaching completion. Compared with the older ships, these new vessels are to have many more seats under cover, and the *Sarnia* will also have 110 berths in cabins and lounges. Both ships are being fitted with bow rudder so that they can enter ports stern first, and with Denny-Brown stabilisers to reduce rolling in rough seas. Each vessel is to have a Ministry of Transport certificate for 1,400 passengers. The Southern Region, British Railways, states that the use of these two ships is expected to eliminate the present financial loss on the Channel Islands services.

**Australian Gauge Conversion.**—The Premier of South Australia, Sir Thomas Playford, has announced that he will seek a conference with the Federal Prime Minister, Mr. R. G. Menzies, on gauge standardisation of the Port Pirie to Broken Hill railway and the construction of a line to Darwin.

**Fault Monitor.**—The Panelec Heating Division of British Insulated Callender's Cables Limited, is now marketing a fault monitor which detects immediately any damage to heating cables during the installation of solid embedded floor warming systems. The fault warning is given by bell and indicator lights.

**Children Injured in Glenfield Tunnel.**—Two sisters playing in a railway tunnel at Glenfield, Leicestershire, were struck by a goods train on August 15. One of them was reported to be critically ill. Seven other children in the 170 ft. tunnel flung themselves into potholes beside the single-line track when the train came through. The children had thought that no train was due for another hour.

**G.M. Shut Down.**—It is reported that the London, Ontario, diesel locomotive building plant of General Motors Diesel Limited, is to be shut down at the end of September. Only about 260 employees are to be retained on accounting, sales and service staffs. It has been stated that this move results from the current almost complete diesel conversion of Canadian railways and the competition in world markets.

**Henry Wiggin & Co. Ltd., Exhibitions.**—Exhibitions of alloys made by Henry Wiggin & Co. Ltd. will take place at the Grand Hotel, Sheffield, and More's Hotel, Glasgow, from September 20 to 27, and September 27 to 29, respectively. Exhibits will include equipment used in vitreous enamelling, pottery kilns, and heat treatment equipment. Further information is obtainable from Henry Wiggin & Co. Ltd., Thames House, Millbank, London, S.W.1.

**Rail Facilities for Farnborough Air Display.**—Special cheap tickets from more than 400 railway stations are being issued by the Southern Region of British Railways for travel to Farnborough Air Display on September 9, 10 and 11. The tickets will be available at most Southern Region stations between Broadstairs on the East Kent coast and the Exeter-Exmouth line in Devon. Tickets from the South-Eastern Counties will also cover the bus journey from Aldershot or North Camp stations to the airfield in buses run by the Aldershot & District Traction Company.

**G.K.N. Group Changes.**—It was stated on page 263 of our August 26 issue that "it had been decided to amalgamate the separate companies in the Guest Keen & Nettlefolds group." This is incorrect. The amalgamation affects only the G.K.N. Group steel companies. From January 2, 1961, the undertakings and assets of Brymbo Steel Works Limited, John Lysaght's Scunthorpe Works Limited, and the Scunthorpe Rod Mill Limited, all separate companies in the G.K.N. Group, will be acquired by Guest Keen Iron & Steel Co. Ltd., also a member of the G.K.N. Group, which will change its name to G.K.N. Steel Co. Ltd. The reference to change of name by Guest Keen & Nettlefolds Limited is incorrect. From January 2, 1961, G.K.N. Steel Co. Ltd. will operate through the following works: the Brymbo Steel Works at Brymbo, near Wrexham; the Guest Keen Iron & Steel Works at East Moors, Cardiff; and Lysaght's Scunthorpe Works at Normanby Park, Scunthorpe.

**British Oxygen Exhibits at the Farnborough Show.**—Exhibits of British Oxygen Research & Development Limited at the Farnborough Air Display on September 5-11, include a miniature expansion turbine, a prototype argon-arc spot-welding torch, and a new high-temperature plasma-jet high-temperature torch.

**Training for Scouts in Rhodesia Railway Townships.**—A special camp in the Matopos has been organised for 93 scouts from the railway townships in Southern Rhodesia to give training in self-discipline, team-work and initiative. The party is being led by Mr. D. S. Fyfe, Welfare Officer, Rhodesia Railways.

**British Standard for Presspaper for Electrical Purposes.**—A new British Standard publication, B.S.3255: 1960, Presspaper for Electrical Purposes, is intended to bridge the gap in requirements between B.S.698, Papers for Electrical Purposes, which covers materials up to 10 mm. thick, and B.S.231, Pressboard for Electrical Purposes, which covers a material similar to presspaper, but which is made in sheet form instead of in a continuous roll. It covers presspaper of either dyed or natural colour, with a smooth calendered finish. Four different types are specified, each not more than 20 mm. thick; and requirements for composition, finish, density, electric strength, tensile strength, oil absorption, and moisture content are laid down. Detailed test methods are provided in a series of appendices. Copies, price 6s., may be obtained from the British Standards Institution, 2, Park Street, London.

**Newton Bros. (Derby) Ltd.**—Mr. Guy Smith, Chairman of Newton Bros. (Derby) Ltd., in his comments on the annual report for the year ended March 31 last, says that the transfer to the new premises is now complete, and has been effected with little dislocation. Among numerous products, the company's voltage regulator has had good sales, and is fitted to many B.R. diesel locomotives and the Pullman diesel-electric trains. Profit available for appropriation was £126,077, as against £124,991, and a dividend of 10 per cent plus a bonus of 6 per cent were declared, leaving £55,435 to be carried forward.

**Government "Against Channel Tunnel."**—Sir Philip Warter, Chairman of the Southern Area Board of the British Transport Commission, stated at the launching at Cowes on September 6, of the British Railways ss. *Sarnia*, that he had no doubt the Government would decide against the Channel Tunnel. Whether the tunnel would or would not be built, he added, was one of the biggest problems facing the Southern Region. He believed the decision would be against the tunnel and the Commission could then go ahead and order long overdue replacements for some of its train ferries.

**Vickers - Armstrongs (Engineers) Limited Agreement with Racine.**—Vickers-Armstrongs (Engineers) Limited and Racine Hydraulics & Machinery Incorporated of Racine, Wisconsin, U.S.A., have announced that they have reached agreement whereby the two companies jointly develop their hydraulic interests and manufacture and sell each other's hydraulic products on a world-wide basis. Racine was founded in 1906 and is now one of the leading hydraulics manufacturers in North America. It produces equipment ranging from individual pumps and valves to complete power and package units working at both high and low pressures. This equipment is incorporated in machine tools, presses, material handling equipment, winding machines, paper machinery, and a wide range of other equipment.



**Earth-Moving Equipment.**—Several types of Muir-Hill dumpers and loaders are being shown by E. Boydell & Co. Ltd., of Trafford Park at the Public Works Exhibition at Olympia, London, W., on November 14-19. One is to be a combined loader/power digger with hydraulic operation.

**Pallet Service for Consignments to the Continent.**—For movement of goods in full loads to the Continent a service, which includes the supply of special steel pallets with wood floors and collapsible sides, has been introduced by Archbolds (Freightage) Limited. Sizes of pallets are 21 ft. 6 in. by 7 ft. 8 in. by 6 ft., and 10 ft. by 8 ft. by 6 ft. Capacities are 10 and 15 tons respectively and unladen weights 30 and 26 cwt. These can be loaded at the works of the exporter and sheeted in water-tight coverings.

**Holman Bros. Ltd. Report.**—At the annual general meeting of Holman Bros. Ltd., the Chairman, Mr. P. M. Holman, reported that results for the year ended March 31, 1960, had shown an improvement over the previous year, but that this was not so marked as had been hoped. The profit of the Group for the year before taxation amounted to £321,000, an improvement of £77,000, and the net profit after taxation, attributable to Holman Bros. Ltd., amounted to £163,000, an increase of £42,000. An interim dividend of 4 per cent less tax was paid in December, 1959, and a final dividend of 8 per cent less tax was recommended. Overseas sales had shown an improvement and represented no less than 69.7 per cent of the total group turnover.

**Special Facilities for Newmarket Autumn Races.**—Inclusive tickets, covering rail and road transport from London to Newmarket Racecourse and admission to the Silver Ring, are being issued by the Eastern Region, British Railways for the autumn flat racing season. Special trains with refreshment car facilities will run on all race days during the season, from September 28 until October 27. Departures are from both Kings Cross and Liverpool Street stations at times between 11 and 11.35 a.m. The inclusive return tickets cost 29s. first and 19s. second class. Return rail and road fares, which do not include admission to the Silver Ring, are 22s. first and 12s. second class. The journey from the London termini takes just over 2 hr., with arrival in time for the first race. The special trains are due back in London at times between 6.20 and 7.15 p.m.

**N.E. Region Autumn and Spring Tours to the Continent.**—As a result of the success of its 1960 Spring tours to Holland, British Railways, North Eastern Region, has planned further tours for this Autumn and next Spring. Bookings have already been received for tours giving two full days in Holland commencing on October 3, 10, 15, 17, 22 and 24. Passengers travel by ordinary trains to Hull Paragon station where a special bus conveys them to the quayside for the sea crossing by Associated Humber Lines Limited ships to Rotterdam. First class cabin accommodation is provided and passengers sleep in the ship each night. Breakfast and evening dinner are on board each day. Sightseeing tours have been arranged. They include a rail trip to Amsterdam followed by a tour of the canals by motor launch, a motorcoach tour to Volendam, a coach tour of Rotterdam, a visit to Delft, and a tour of The Hague. This inclusive tour costs £15 from stations in the East and West Ridings of Yorkshire, and £16 from the Newcastle area. Similar tours are being planned as a regular feature in the future. Five itineraries have been prepared for the Spring of 1961, offering two and three day tours which include visits to the bulb fields

and to other places not scheduled in the 1960 tours, such as Arnhem, Brussels and Gouda.

**Italian Railcars.**—At the beginning of 1960 the Italian State Railways had a total of 962 diesel railcars plus 121 special railcar-trailers.

**Machine Tool Exhibition at Manchester.**—At the Northern Machine Tool Exhibition being held by B. Elliott (Machinery) Limited at the City Hall, Deansgate, Manchester, on September 19-24, over 80 British-made new machine tools will be shown under power. An open-sided planer, the Invicta-Hydetsco, is being transported to Manchester by low-loader; this machine and controls weigh 16 tons. Details and tickets may be obtained from B. Elliott (Machinery) Limited, Victoria Works, Willesden, N.W.10, telephone Elgar 4050.

**R.C.T.S. "Northern Heights" Tour.**—A trip by special train over lines of the Eastern Region, British Railways, in East and North London has been arranged by the Railway Correspondence & Travel Society for October 1. Departure will be from Fenchurch Street Station at 1.55 p.m. The route is via Barking, Forest Gate Junction, Bow Junction, Hammond Junction, East India Dock (Goods), Millwall Junction, Poplar Central, Camden Road Goods & Mineral Junction, and Finsbury Park to Edgware, returning via Finsbury Park and Canonbury to Broad Street, arriving at 6.15 p.m. It is hoped to provide cafeteria car services on the train. The cost of the tour will be 12s. 6d., including itinerary. Applications, with remittances and stamped envelope, should be sent to Mr. J. Miller, 65, Hollington Crescent, New Malden, Surrey.

**Hackbridge Holdings Limited Results.**—The group net profit for the year to March 31, 1960 was £58,013 (£137,496) and the dividend 20 per cent (same) and proposed one-for-one scrip issue. Fixed assets were £1,964,653 (£1,873,599), and current assets £2,229,054 (£1,673,270). Current liabilities were £1,531,400 (£857,174), including overdrafts £293,978 (nil). If demand continues and reasonable profit margins can be achieved, reasonably good results may be expected. The annual general meeting will be held at the May Fair Hotel, Berkeley Street, London, W., on September 30.

**William Cory & Sons Limited Results.**—Steps taken over the past ten years to broaden the basis of activities of the group have led to an important change in the distribution of earning power as between its different interests. Foreign business has dwindled, but warehousing, cold storage, shipping, and forwarding, not a part of the business in 1950, make a valuable contribution. Group trading profit for the year to March 31, 1960, was £2,294,132 (£2,545,767) and the net profit £959,472 (£1,139,993). The dividend is held at 15 per cent. The annual general meeting will be held at Cory Buildings, Fenchurch Street, E.C., on September 22, at 11.30 a.m.

**Waterloo Travolator to be Opened in October.**—The travolator between Waterloo Southern Region station and the Bank, which will transport 1,200 people in two minutes from the station to the booking hall at the Bank end, is expected to be ready for testing by September 17, and will be officially opened on September 27 by the Lord Mayor, Sir Edmund Stockdale. The travolator, designed by the Otis Elevator Company, is a 354-ft. moving strip of non-slip metal running at a constant speed of 180 ft. a minute. This can be varied according

to train arrivals and departures, and numbers of passengers. The tunnel is lit by strip lighting at hand-rail height along the walls, augmented by roof lights at intervals. The originally estimated cost of about £750,000 will not be greatly exceeded.

**Pakistan Railways Earnings.**—The approximate earnings of the Pakistan Railways for the month of June, 1960, amounted to £4,585,000 compared with £3,900,000 during the corresponding month of the previous year. The approximate cumulative earnings from the beginning of the financial year (July 1, 1959) amounted to £51,524,000 as compared with the £49,625,000 during the corresponding period of the previous year.

**Victor Britain Limited Displays at Western Region Stations.**—Displays of motorcars used in the Autobritain car-hire service of Victor Britain Limited, for passengers arriving at British Railways stations, were arrayed at Paddington, Birmingham Snow Hill, Bristol Temple Meads Stations, Western Region, British Railways, on September 8, when the new diesel-electric Pullman trains to work the "Birmingham Pullman" and "Bristol Pullman" services were on view to the public.

**T.D.A. Laboratories Open Day.**—The research laboratories of the Timber Development Association Limited, near High Wycombe, Bucks, will be open to the public on Wednesday, October 12, and Thursday, October 13, from 9.30 a.m. to 5 p.m. Anyone wishing to visit the laboratories on either of those days should get in touch with the Secretary of the T.D.A.—at the headquarters of the Association, 21, College Hill, London, E.C.4.

**Output of Engineering and Electrical Goods.**—Production in the engineering and electrical goods industries in June, which this year included the Whitsun holiday, was, it is estimated, 6 per cent more than a year earlier. Taking May and June together the increase was 8 per cent; in the first four months of the year production had been 13 per cent more than in the first four months of 1959. As engineering output was expanding rapidly in the first half of last year this shows a slackening in the rate of growth of production. The volume of exports of the products of the engineering and electrical goods industries in the second quarter was a little less than in the first, when engineering exports were particularly high, but 6 per cent more than a year earlier. In the first half of 1960 the volume of engineering exports was 9 per cent more than in the first half of 1959.

**Derailment Caused by Failure of Locomotive.**—In his report on the accident at Settle, London Midland Region, British Railways, early on January 21, when five of the 75 passengers in a Glasgow to St. Pancras express were killed and eight passengers and the guard of a goods train were injured, Brigadier C. A. Langley, Chief Inspecting Officer of Railways, Ministry of Transport, finds that the accident was caused by failure of the "Britannia" class locomotive. Part of the motion assembly drove into the track and caused derailment of a goods train, which in turn tore out the sides of three coaches of the express. A slide bar fell off 30 miles from the scene of the accident, and a second one eight miles farther on. The driver heard the knocking and stopped to examine the engine but did not notice the loss and continued the journey. The engine ran in that dangerous condition for 20 miles before the piston rod, cross head and connecting rod came adrift. The train was then travelling at about 45 m.p.h.



**South African Co-operation in C.C.T.A.**—Mr. Eric Louw, Minister of External Affairs, stated on September 1 that South Africa might be forced to withdraw its membership of the Commission for Technical Co-operation in Africa south of the Sahara (C.C.T.A.), as South African representatives could not be expected to attend conferences in African States which had expressed disapproval of South Africa's domestic policies.

**Factory Equipment Exhibition, Manchester.**—Exhibits contributed to the Factory Equipment Exhibition at Belle Vue, Manchester, from September 21 to October 1, 1960, by the Brush Electrical Engineering Co. Ltd. will include battery electric tractors, models S.D. and R.D.1, battery electric high loader elevating platform truck, model H.E. 30, and battery electric flameproof truck, model L.E. 36.

**Swedish Ball Bearing Company New Shares.**—Arrangements have been announced whereby shareholders of the Swedish Ball Bearing Company may obtain the new shares to which they are entitled in connection with the one-for-three scrip issue. Share certificates may be lodged with Philip Hill Higginson Erlangers Limited, 34, Moorgate, E.C., accompanied by application forms. Documents may be lodged only by authorised depositaries.

**Ruston & Hornsby Limited Report.**—At the annual general meeting of Ruston & Hornsby Limited, the Chairman, Mr. W. J. Ruston, stated that group profit showed an increase of £5,990 on the previous year. Output had increased, and valuable export orders had been secured, including orders for air-cooled diesel engines. New types of locomotives had been placed on the market, and the development of additional turbine models was progressing. An increase in boiler business had been achieved. He also emphasised the need for new overseas markets.

**George Cohen 600 Group Limited Report.**—The Chairman of the George Cohen 600 Group Limited, Mr. C. M. Cohen, states that the net profit attributable to the members of the Group amounted to £784,890 for the year ended March 31, 1960, compared with £662,635 for the previous year. Machinery trading has shown substantial improvement, and overseas subsidiaries have contributed to trading expansion. The annual general meeting will be held at Grosvenor House, Park Lane, London, W.1, on September 27, at 3 p.m.

## OFFICIAL NOTICES

**DRAUGHTSMAN** required with knowledge of Railway Switch and Crossing Work. Excellent prospects. Apply in confidence giving details of age, experience, qualifications, and salary required, to the Secretary, Isca Foundry Co., Ltd., Newport, Mon.

**THE NIGERIAN RAILWAY CORPORATION** invites applications for the following post:

### TELECOMMUNICATION ASSISTANT

**Duties:** The officer will be required to supervise the operation and administration of Telecommunication in a district involving radio circuits, telegraph networks, and P.B.X.'s.

**Qualifications:** Candidates must have (i) a thorough knowledge of the operation and maintenance of all equipment used for telecommunication purposes on the Railway; (ii) a detailed knowledge of all regulations, local, and where applicable, International, appertaining to Telecommunication working generally; (iii) ability to supervise the communications of their district to obtain most efficient

results and to improvise alternative routing; (iv) capacity to control staff and set examinations and (v) possess a P.M.G. Certificate Class I or II in wireless and radio telegraphy.

**Salary:** In scale £1,585 x £55-£1,915 per annum (inclusive of Overseas Pay), commencing salary depending on experience. Appointments are on contract with a gratuity payable on completion of contract at the rate of £26.10.0d. to £31.18.4d. for each completed month of service.

**Tours:** 15 months in Nigeria followed by 15 weeks' leave on full pay.

**Quarters:** Partly furnished quarters are provided at low rental.

**Allowances:** There are attractive family, travelling, transport and other allowances.

Send postcard before 23rd September, 1960, mentioning the post and this paper for further particulars and application form to:

The London Representative,  
Nigerian Railway Corporation,  
Nigeria House Annex,  
The Adelphi, John Adam Street,  
London, W.C.2.

## Forthcoming Meetings

**September 10 (Sat.).**—Permanent Way Institution, London Section. Visit to Temple Mills Marshalling Yard and hump control. Joint visit with the Exeter & West of England Section.

**September 10 (Sat.).**—Railway Correspondence & Travel Society, Kegworth-Kingston-Gotham-Nottingham, and Gypsum Mines tour.

**September 11 (Sun.).**—Railway Correspondence & Travel Society, "The East Midlander" No. 4: Nottingham to Eastleigh and Swindon tour.

**September 13 (Tue.).**—Railway Correspondence & Travel Society, East Midland Branch, at the Thurland Hall, Nottingham, at 7.30 p.m. B.T.C. film show.

**September 16 (Fri.) to September 19 (Mon.).**—Institute of Transport week-end course at Oxford.

**September 19 (Mon.).**—The Historical Model Railway Society, at Keen House, Calshot Street, N.1, at 7 p.m. Paper on "Welsh railways records," by Mr. T. L. Jones.

**September 19 (Mon.).**—Railway Correspondence & Travel Society, Merseyside Branch, at the Woodside Hotel, Birkenhead, at 7.30 p.m. Paper on "Main-line diesel locomotives," by Mr. G. O. B. Clark.

**September 20 (Tue.).**—Institution of Locomotive Engineers at Institution of Mechanical Engineers, 1 Birdcage Walk, London, S.W.1, at 5.30 p.m. Presidential Address of Mr. D. C. Brown.

**September 22 (Thu.).**—Railway Correspondence & Travel Society, West Riding Branch, at the Railway Institute, York, at 7.15 p.m. Paper on "Railway heraldry," by Mr. George Dow.

**September 23 (Fri.).**—Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, 163, Eversholt Street, London, N.W.1, at 7.15 p.m. Paper on "L.B.S.C.R. suburban services," by Mr. O. J. Morris.

**September 24 (Sat.).**—The Permanent Way Institution, East Anglia Section. Visit to Brook Marine Limited, Lowestoft.

**September 24 (Sat.) to September 25 (Sun.).**—British Railways, Southern Region, Lecture & Debating Society. Tour of installations in South Wales.

**September 26 (Mon.).**—Institution of Railway Signal Engineers, Bristol Section, at Temple Meads Station, Bristol, at 6 p.m. Paper on "Signalling from the driver's point of view," by Mr. O. S. Nock.

## Railway Stock Market

A set-back in markets towards the end of last week was followed by a rally, with lower prices attracting buyers, though demand was selective. Shortage of shares was again an important factor, partly because of buying by unit trusts, pension funds, and other large long-term investors. Although views differ as to when a cut in the bank rate is likely, a higher bank rate, or an increase in the credit squeeze is now considered unlikely. The belief is growing that over the next few months share prices are more likely to rise than fall.

Once again there were only small movements among foreign rails. Costa Rica ordinary stock has changed hands around 40. Chilean Northern 5 per cent first debentures were dealt in at 55½. United of Havana consolidated stock was 1, while the second income stock eased from 6½ to 6½.

Sao Paulo Railway 3s. units were again quoted at 1s. 1½d., and, elsewhere, Brazil Railway bonds eased from 6 to 5½, and Guayaquil & Quito Railway assented bonds were 69.

In other directions, Antofagasta ordinary stock eased from 13½ a week ago to 13, and the preference stock from 31½ to 31.

Nyasaland Railways shares were 9s. 6d. Canadian Pacifics have moved back with Wall Street, and at \$42½ compared with \$44 a week ago. The preference stock at 60½ was fractionally better and the 4 per cent debentures strengthened from 63½ to 63½. White Pass and Yukon shares have been maintained at \$11½.

Among locomotive building and engineering, Beyer Peacock 5s. shares improved from 7s. 3d. a week ago to 7s. 6d., but Gloucester Wagon 10s. shares kept at 12s. 9d. though Wagon Repairs 5s. shares were good at 16s. 6d. and Westinghouse Brake & Signal have moved up from 47s. to 48s. 3d.

North British Locomotive at 9s. 9d. failed to hold all an earlier gain, while Birmingham Wagon were 33s. 10½d.

British Oxygen have been good at 33s.; since these shares have been quoted in 5s. units they have attracted more attention, and sentiment has also been helped by higher dividend hopes. Metal Industries were 68s. 9d.

Among machine tools, Asquith 5s. shares were 12s. 10½d., Wolf Tools 5s. shares 14s. 9d. and Alfred Herbert 61s. 3d. Craven Brothers 5s. shares changed hands around 8s. 1½d.

Hopes that the 10 per cent dividend may be maintained put Vickers up to 33s. 10½d., at which there is a yield of just under 6 per cent. Charles Roberts 5s. shares were 11s. 9d.

Dowty Group 10s. shares at 39s. 6d. compared with 38s. 9d. a week ago, but Pressed Steel 5s. shares eased from 30s. 9d. to 30s. 3d. Pollard Bearing 4s. shares have been maintained at 46s. 3d. and Ransome & Marles 5s. shares lost a few pence at 27s. 6d.

In other directions, Broom & Wade 5s. shares firmed up from 22s. 3d. to 22s. 9d. Stone-Platt were 55s. 3d. at which there is a yield of over 5½ per cent on last year's 15 per cent dividend. Ruston & Hornsby at 30s. 3d. were within 3d. of the level a week ago. There was buying of J. & J. Weir 5s. shares, which have risen to 18s. 9d., from 17s. 3d. a week ago, but Babcock & Wilcox came back to 35s. 10½d., and Clarke Chapman at 47s. failed to hold all an earlier rise, but Hopkinsons gained 1s. at 106s.

There was better demand for steel shares with Dorman Long at 47s., United Steel at 86s. and Firth & Brown 50s. 3d. Guest Keen were firm at 100s. 6d. and a yield only 3 per cent, but this reflects higher dividend hopes.

